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AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCE-
MENT OF ARCHITECTURE IN MATERIALS OF CLAY.

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CONVENTION OF ARCHITECTURAL CLUBS.

WE have received copies of a letter which has been sent to each of the architectural clubs in the United States by the Chicago Architectural Club, with the sanction and support of the T Square Club, of Philadelphia, and the St. Louis Architectural Club, and with the informal approval of the Boston and Cleveland Clubs, calling for a convention of delegates from the various architectural bodies to be held at Cleveland, Ohio, Friday and Saturday, June 2 and 3, the object of this convention being to promulgate reciprocity among the different clubs, to bring about a more friendly feeling through a better understanding, and to discuss such plans as will be of the greatest mutual interest, such as club organization, management, and work. To all acquainted with the management of architectural clubs the great benefit to be derived from such discussion is too obvious to need mention, and this movement is certainly deserving of the strongest moral support.

The movement which has resulted in architectural club growth had its origin in 1880, when the New York Architectural League was organized by a few earnest junior members of the profession. Originally nothing but a mere association of draughtsmen, the Architectural League soon recognized that it had a broader field and scope of action, and a reorganization, which was effected about 1883, threw open the membership to artists and art amateurs, and so broadened the possibilities of the League that it has since been able to grow into its position as a leading factor in art matters of not only New York City, but to a very considerable extent the country

as a whole, while the fact that it is not merely an architectural association, but rather an association of those who have a keen interest in architecture, has given to its deliberations and to its acts a value which a strict professional body might not be accorded.

The League was followed by the organization of the T Square Club in Philadelphia, the Boston Architectural Club, and the Chicago Architectural Club, all of which have had a steady, persistent growth and have been emulated by clubs in Cleveland, St. Louis, and a number of other cities. Nearly all of these clubs have been upon practically the same general plan, namely, an association of those who were interested in architecture, making little, if any, distinction between the practising architect with years and experience behind him, the draughtsman fresh from school, or the artist amateur, the members uniting upon the common ground of interest in the profession and cooperation of ideas with the painters, sculptors, and decorators. Incidentally, all of these clubs have been able to foster very considerable social feeling among the members, and the amenities of life, as well as the niceties of professional practise, have been considered to advantage. The strong work, however, accomplished by these societies has been strictly in the line of architecture, and all our readers know the great influence which has been exerted by these bodies, especially by the League and the T Square Club, which are recognized powers in their respective communities.

The positions which these bodies have acquired carry with them responsibilities which we are glad to see are fully recognized by the leading men therein. The architectural clubs can take positions that would not be within the province of the American Institute and can take a part in the civic life which would not be in harmony with the dignified, conservative position of the strictly professional body, while the mingling of the architects and the representative of the allied arts gives a possible weight to the deliberations of the club, which we imagine would count for more with the average layman than the acts of a purely professional body. All of these clubs seem to have agreed upon making it one of their chief aims to hold annual exhibitions. This is something which was rarely attempted by any of the chapters of the Institute, and is a work which has naturally fallen to the clubs, and has, on the whole, been so worthily carried out that one can find little to complain of.

The clubs also have very generally done a great deal in a field which has been too much neglected in this country, namely, the education of the draughtsman. Any one who recalls the conditions existing in this country twenty or twenty-five years ago and compares the average draughtsman of those days with what we can reasonably expect now, can readily appreciate that a tremendous advance has been made in the development of architectural education, and while of course the fundamental work has been done by our architectural schools, the clubs have been able to reach the class of young men who have not been able to profit by the opportunities of the technical schools. In their attitude towards public policy the Philadelphia and the New York clubs have been preeminently successful and each organization has counted very materially in molding public sentiment.

There is every reason, therefore, to expect that this convention may not only be fully attended, but that the representatives may be picked men from the various organizations, who will appreciate all the possibilities of this movement, and that the convention may

result in giving new life to architectural education and the expansion of the club influences.

HIGH BUILDING LEGISLATION.

WE referred in these columns some months since to a recommendation made to the State legislature by Governor Wolcott, of Massachusetts, advising a restriction of height of buildings to be built adjacent to the State House. This recommendation bore fruit in the shape of several measures which were presented for consideration, one of which finally reached the legislature in the shape of a bill, very far reaching in its scope, which was to restrict to 100 ft. the height of all buildings hereafter to be erected throughout the State. As the *Boston Herald* very truly said, if this law had been enacted it would have been a decided advantage to Boston, and would have led to a more harmonious and artistic form of construction. The difficulty in enactment of any such law as this, however, is that the real-estate values throughout the city have all been adjusted during the past few years to the basis of the earning capacity of a building carried to the present legal limit of 125 ft. Boston is peculiarly constructed in that the greater portion of the city is occupied by buildings of so slight value in a commercial sense that in any transactions for the sale of the land the value of the building is practically disregarded. The attempt at this date to arbitrarily slice off 25 per cent. of the possible earning capacity of the land is too revolutionary not to encounter the strongest opposition, and very naturally the proposed bill was promptly and emphatically rejected by the legislature. It is rather doubtful if any such measure is proposed again in this Commonwealth, for while a building of 125 ft. seems very high by comparison with the average business structure of twenty or twenty-five years ago, it is small as compared with the towering structures of New York. As a matter of fact, few of the exigencies of modern business conditions lend themselves favorably to artistic success, and the argument that a high building, though a commercial necessity, is an artistic blot, is one which, however true it might be in principle, would not seriously weigh in the minds of many legislators, if we may judge by the fate of the recently proposed bill.

There are other directions, however, in which the legislators can act to the greatest advantage, namely, in the extension and more rigorous enforcement of fire proof construction. The *Boston Herald* advised that no building not absolutely fire-proof should be carried to a height greater than 70 ft., that no building to be used for a large number of families should be built of wood, and that no wooden building unprotected by brick walls should be constructed within a minimum number of feet of another wooden building. We have repeatedly advocated an even greater extension of fire-proof construction, and we hope the time will come when no building of what is called second-class construction, namely, without fire-proof floors, will be tolerated anywhere within the business districts. A bill is now before the legislature prohibiting wooden buildings within a large area of the city, or, rather, prohibiting the erection of wooden buildings anywhere except under special permit. This bill will undoubtedly pass, and we believe will receive very little opposition from interested parties. As a whole, it is one of the most important of the many attempts which have been made within the past few years to amend the building laws of this city.

EVOLUTION vs. ORIGINALITY IN DESIGN.

TO THE EDITOR OF THE BRICKBUILDER:—

The stand you have taken in your editorial in the April number of *THE BRICKBUILDER* on "Copyright in Architectural Design" ought to be satisfying to any candid observer of the progress of architecture in this country. There may be a few cases in which architects' designs have been copied for the sole purpose of getting something without paying more than a nominal amount to a draughtsman for the cost of copying, but even in these the first architect

is not a loser, because the man who orders a copy made by an outsider would be the last to employ any one and pay the full price for a copy or a new design. On the other hand, if the copy is a good one it is a compliment to the original designer, and he can claim all the benefits of the advertisement.

A common cause for grumbling among young architects is that the owner sometimes erects a second house from the plans made for the first one, which he has paid for, without giving the architect additional compensation. In these cases the owner thinks it will not only be economical, but that he can avoid any dispute as to whether or not the plans should be paid for twice, by employing some one else to supervise it. The really mean thing he does is to secure a set of copies surreptitiously, and generally from a builder. In the latter case the architect discovers too late that he has neglected to protect himself in a way that all know about, by stamping all copies as his property and to be returned. In every case the architect discovers too late that he might have copyrighted his plans, and thereby protected himself in a measure, though there are many ways to get around copyright for architectural designs. His loss is generally only in disappointment and temper, and he has little cause for either, because any architect with business sense would only, under these circumstances, charge his client for additional copies of the plans and specifications, and his fee for supervision, if the latter were desired. But it is from the artistic side that the least objection to having buildings copied can hold; and this can only be so in the case where a cheap imitation of a good design is made. The materials of construction may be changed and the details indifferently executed. The author of the original design is under the necessity of protesting to his friends that the imitation is not his own, and to the public that his reputation is endangered by the possibility of being given the credit for it. But, as you say, the architect of reputation can afford to be indifferent to this.

Now, aside from all personal considerations, I hold that a disposition to copy the designs of buildings already executed is one indication of a healthy architectural evolution. A copyist will not copy anything that he does not think to be good. If he makes changes, they will be either in the direction of omitting superfluities or adding what he thinks will be improvements. It was always so in the great periods of art; and why should it not be so now? The many unfortunate attempts to display originality have done more than anything else to debase the arts of this century. Whenever it ceases to be considered as "bad form" or as showing want of natural ability for an architect to copy or imitate the work of a rival, thoughtful and judicious designers will generally do so; and it is only absurd notions of propriety and the false ethics of the profession in this regard that stand in the way. Instead of this being regarded as piracy, it should be considered as a compliment by the architect whose ideas are followed and developed.

You have well said that no man of ability is likely to wish to reproduce his own works. The time between the making of a design and its final execution enables the designer to see many things in it which might have been better done. If he were called upon to reproduce it, his second effort would be an improvement in some particular, and thus the same evolution would be going on within him which others should be privileged to share with him for the good of their art. Should he prefer to make an entirely new and original design for the purpose of displaying his own versatility, he might not only make a worse one, but would stand in the way of the development of his own esthetic powers. He would be doing what—according to the ethics of the profession accepted by so many—it is expected that his neighbor should do, if called upon to reproduce or copy his work. Such are the ethics of selfishness and egotism. They are monopolistic as applied to an art which has no vitality unless it is free to all, and based on the natural and recognized laws of evolution. These views, once repugnant in the extreme to the writer, are now the result of many years of experience, study, and observation.

PETER B. WIGHT.

The Formal Garden. II.

BY ELMER E. GARNSEY.

HAVING considered some of the general principles of formal gardening in the preceding paper of this series, the subject may now be taken up in detail.

Time and money are always matters of importance, and the formal garden, as a problem in design and construction, must be considered from both standpoints, and it may be said at the outset that fine gardens are not to be had cheaply, nor may they be brought to perfection in a short period of time. Good taste is, of course, not to be measured in terms of dollars and cents, but the gratification of luxurious tastes must entail considerable expenditure, and the ideal garden must depend in great measure on the intrinsic beauty of its constructive details, the materials employed therein, and the adornment of that construction.

The modern American architect is often as much of a necromancer as Aladdin's genie of the lamp, who created palaces in a night; but even his magic touch is powerless to work the spells which Nature alone can accomplish, and no client, however insistent, can put her under forfeiture to complete her work by a certain date, nor will she put on an extra force of mechanics to gain any premiums which may be offered her. For while the garden may be properly planned, built, and garnished with statues, trees, and flowers, the alchemy of time is required to wed man's handiwork with that of Nature, and if harmony of effect is to be acquired this must be accomplished.

The location of the garden may not always be a matter of choice, but when possible sloping ground is usually favorable for satisfactory treatment. The garden itself should be level, but charm of effect is best obtained where its level spaces are contrasted with rising ground on one side and a slope on the other. Such a location also permits the employment of water effects to a greater extent and with less labor and expense, and no one who has seen and appreciated the exquisite charms of old French and Italian gardens, where water is made to trickle from the brims of marble basins, to slip and ripple along tiny stone conduits, to flash gloriously in the sunlight from some great fountain, or to sleep unruffled in broad pools overhung with shrubbery,—no one sensitive to such beauty would willingly lose the opportunity for realizing in his own garden something at least of this sort.

It would be fortunate if a grove of trees, already full grown, should be found where their mass would count as a background for the garden, shut out from it by the boundary wall, yet sufficiently near to compose properly with its architectural lines.

After the location has been determined, the plan becomes of the greatest importance. Its scale has presumably been set by that of the house or building which it adjoins, and as its ground plan is a study of horizontal planes, in contrast with the vertical planes of structure and trees, the opposing effect of the other is thereby reduced or emphasized. If the rectangular masses of the house are contrasted with curved or rococo forms in the garden, the desired end of carrying the structural forms of the building out into nature will be thereby less successfully achieved.

Simplicity and symmetry of plan are always admirable and

especially so in a garden, for as the latter is situated so we may look into it from the house, the anatomy of its plan should be at once recognizable and uncomplicated. Its principal axis should be at right angles with the façade of the building, and preferably coincident with some axis of the structure. The main axes of the garden are expressed by the principal walks which traverse it, and



AN EXAMPLE OF VILLA ARCHITECTURE IN NEW ENGLAND.

as these bisect in the center of the garden, it logically follows that we have at once divided it into four parts of approximately the same area. Other walks follow closely the boundary walls, and the plan of the garden becomes in a word a cross laid in a rectangle.

The four plats may be again divided and subdivided, that access may be had to the flower-beds, but the same system of symmetrical division is so certain of accomplishing good results that it may safely be recommended as the best to follow.

The intersection of the principal walks would naturally be accented by a circular central space, whose radius should be twice the width of the walks, and while in many examples the center of this circle is occupied by a statue, fountain, or similar object, it is desirable that it should remain unencumbered, leaving the axis unbroken from end to end.

Some architectural form, as a casino or pavilion, should mark the further end of the garden, and by recalling the structure at the opposite end this will aid in fixing the bit of nature between walls, making it completely a part of the habitation, as it should be.

The casino or pavilion should be open on the side facing the house, and its floor of marble tiles or brick should be raised some steps above the level of the garden. The interior may be plastered and decorated with painting or mosaic, and furnished with such tables and chairs as the Pompeians used, with bronze legs and marble and leather coverings, and in this delectable retreat "my lady" will preside at high tea on summer afternoons, with her court all in attendance.

The fountain, for there will be at least one fountain, may be placed in front of the pavilion, its basin of marble or terra-cotta, the spray issuing from perforated pipes whose openings are just at the surface of the pool. For a small fountain nothing better has been devised than a shallow circular basin supported by a central shaft, into which the water flows silently and steadily until it brims over and trickles from the margin in splashing drops and tiny streams. The garden fountain is at its best when it is simply an *obligato*, not a strident and uneasy thing, in haste to quit a quiet retreat.

The Pompeian fountains, which consisted of a series of steps



A SIMPLE FORMAL GARDEN IN NEW ENGLAND.

set in a niche, down which a thin sheet of water rippled softly into the basin beneath, were designed by men who appreciated the charm of falling water to just the degree to which it becomes a thing of beauty, and these mosaic fountains might be as readily adapted



ENTRANCE TO AN AMERICAN VILLA.

to the American formal garden as they were in the portico of the New York State building at the Columbian Exposition.

The severity of our climate compels the most careful consideration of foundations for walls, walks, and all garden architecture, for these are to be as permanent as the construction of the buildings. Effect for a single season may be easily gained. Indeed, one enthusiast whose patience and pocket were both limited built a garden wall in New England with wooden posts, lathed and plastered, and for one summer he enjoyed the privacy which this afforded. A single winter's frosts and snow were sufficient to teach him the lesson that nothing is too good for a garden wall, for the plastering fell off in sheets, and the posts stood awry before the springtime came again.

The wall goes a long way toward making the garden. It gives the sense of enclosure and protection and should be so studied that it may be architecture as well as building.

Piers and proper divisions relating to the general plan of walks and beds, niches for statues or vases, and permanent seats should all assist in making it something more than simply a permanent fence; but permanence it must possess, and this is to be gained only by excellent foundations.

Frost delves deeply in this latitude, and the laying up of stone foundations is too often left to an ignorant or careless workman, without the constant supervision which is essential to satisfactory construction. The material of which the wall is built is of no little importance, for it forms a background for the whole scheme. Native stone, where such exists, may be employed, but the surface should be reasonably smooth. Rubble work is not suitable for this purpose, as it is too "rustic" and characterless.

Good red brick is the most acceptable material both as to color and texture, contrasting agreeably with the masses of green in the beds and the graveled walks. Trellises may be built against the wall, upon which climbing plants and roses may be trained, and these should be of bamboo poles fastened in the brick joints with copper "holdfasts."

The walks are to be bordered with strips of marble, terra-cotta, or brick, and when expense must be carefully considered these borders may be of wood.

Within the plats, closely following the borders, a hedge of small box trees emphasizes the walks and begins the plant motive. The box should be kept closely trimmed in formal fashion, flat on top and vertical on both sides.

In some old Italian and English gardens the box has grown to a great height, rising on each side of the walks as living walls of green, and needing only a roof to transform the garden into an actual structure for habitation. The Quirinal Gardens in Rome have such hedges 30 ft. in height, giving a most unique and charming effect, although they are decidedly out of scale and are to be admired less for imitation than for individuality.

English landscape gardeners have long been enthusiasts in the art of "pleaching" or trimming box and other trees into geometrical and fanciful forms, debasing a perfectly proper and valuable process into a bizarre and ridiculous caricature, for while it is allowable to trim a tree into a symmetrical form, one in which it is conceivable that it might have grown under natural conditions, it is absurd to pleach it to the shape of an animal or to the contour of an inverted cone or pyramid. The very acme of absurdity is reached in the gardens at Packwood, in Warwickshire, where the Sermon on the Mount is literally represented in clipped yew! And at Risley, in Derbyshire, two enormous doves are clipped out in green, standing on the hedge, their bills forming an archway over the walk.

The foundations for the walks are almost as important as those for the walls, and must be deeply laid with large stones at the bottom for drainage. The walks are finished with gravel, which should be white, or as nearly white as may be obtained, well rolled and slightly crowned, that the water may be drained off at the side. Provision for carrying off this water must also be made, that the walks may dry quickly after the passing summer shower.

Small trees of formal shape are of great value in the garden, and while indigenous pines and cedars are reasonably adapted to this purpose, bay and orange trees are much to be preferred. Their solidity of foliage and adaptability to spherical clipping, supported by slender and branchless trunks, add dignity to the garden, and in a way they give the sense of height that is needed to break the monotony of the horizontal plane. These trees must of course be placed in pots or tubs so they may be removed to protected quarters during the winter. They may be

planted in wooden tubs with handles for carrying, but large terra-cotta pots should be provided into which the tubs may be set.

The Neapolitan pots are of agreeable form and tradition, copies of which may now be obtained in this country. These copies are hardly as individual in modeling as their prototypes, but as they are made of better clay and are harder they are less liable to injury in handling.

As the placing of these trees plays an important part in the



AN EXAMPLE OF THE VALUE OF ARCHITECTURAL LINE IN LANDSCAPE, AT WINDSOR, VT.

effect of the garden, their location should be determined by the architect who plans the villa, and he will naturally arrange them in such a manner that they will emphasize the symmetry and formality of the whole scheme, by placing them along the principal walks, at their intersections, and at the corners of the plats.

In Italy, where almost every vineyard and garden produces a crop of archaeological or artistic treasures, it has been customary to utilize these fragments in the decoration of the gardens, and many Roman villas are veritable museums of antique art, where statues and busts, usually mutilated and frequently miserably restored, sarcophagi, vases, columns, and capitals, bits of entablature and inscriptions are displayed against or upon the walls, and frequently are built into them.

These fragments, gnawed by time and discolored by the elements, are peculiarly adapted to the enrichment of a formal garden, and we can only regret that the American aborigines could not have been more considerate of posterity, and left us a more plentiful supply of antiquities suitable for the adornment of our gardens of to-day. The supply from Italy and elsewhere in Europe, although apparently inexhaustible, is yet unequal to the demand; and while we should hardly be willing to deny ourselves the possession of Roman antiques, although not of our native soil, the lack of such excellent art should make us the more appreciative of the talent and wares of our own sculptors and manufacturers.

We have successfully competed with European bridge builders and locomotive makers, and such material triumphs ought to incite us to further victories in both industry and art; and if our people of refinement and wealth would encourage our artists and artisans to produce the best of which they are capable, offering them a certain market for their best productions, there would be both a revelation and a revolution in American industrial art, the sure and only foundation upon which would eventually arise a national triumph in the fine arts.

It may be said that our eminent painters and sculptors are striving for important public commissions, and that they place a high estimate on the value of their services; even so, there is a legion of young and clever artists, men and women of taste and talent, who would be only too glad to give their best efforts in creating beautiful things for the adornment of our homes, both within and without the house, for comparatively small remuneration, if they should receive the smallest recognition and encouragement from those whose culture and wealth practically make them, under our form of government, responsible for the upbuilding of our national art.

European gardens abound in sculpture, good, bad, and indifferent. It is an extremely poor statue that does not look fairly well framed in, or silhouetted against a background of living green; and a good statue seldom appears at better advantage than in association with verdure; for proof of which see the annual Paris Salons, our own Sculpture Society and architectural exhibitions. But many of those who can afford to buy sculpture at all are inclined to buy it when in Florence or Rome; where a few hundred francs will purchase a life-size "Marguerite" in white marble, with the loveliest plaited hair, blowing petals from the most natural looking daisy imaginable, or some other equally smooth and smug "example of art."

The French and English artists of the last century used lead and zinc for garden statuary, painting it white or gray in imitation of marble; and where the paint has worn off, as in the fountain groups at Versailles, the effect is most unprepossessing and dismal.

Good marble work is comparatively expensive, and save in rare instances, the finished work does not bear the impress of the sculptor's hand, who invented and modeled the figure,—it is a translation of his work by a mechanic.

Terra-cotta, however, is one of the most personal of materials, retaining the very imprint of the sculptor's hand; it is capable of receiving any texture, and while its natural color is very agreeable, it is now possible to apply to it a wide range of beautiful polychrome, rendering it the most pliant sculptural material in use.

Church Architecture in Materials of Clay.

BY THOMAS CUSACK.

THE last example given in illustration of this subject was a small suburban church whose chief claim to distinction lay in its very attractive brick and terra-cotta spire. We now turn to a group of ecclesiastical buildings in New York, of much greater magnitude and complexity, calling for a relatively high degree of technical and artistic skill in a successful execution of the architects' intention. These buildings cover ten city lots, or 25,000 sq. ft., and extend through the block between 13th and 14th Streets, a little east of First Avenue. Brick and terra-cotta are the materials used on both elevations, from sidewalk to the finials on the turrets of the tower. The color is a light brown, not in simulation of any building stone with which we are acquainted, but possessing a degree of uniformity not surpassed by nature's own product. A general view of the 14th Street elevation is given at Fig. 8, and a few of the more important details are reproduced on a scale equal to the space at our disposal. The architects in this case, as in that of another and somewhat similar establishment in brick and terra-cotta, to which some attention will be given on a future occasion, are Messrs. Barney & Chapman.

Starting with a handsome and well-arranged church as a nucleus, the scheme develops into a clergy house, parish house, club house, and a hospital; all of which, if not under the same roof, are covered by a series of adjoining roofs, and are under the same general management. These institutions are again subdivided into apartments in which industrial trades are taught, with room for a gymnasium, kindergarten, etc., and — which is by no means the least important — a cooking school. Ready access and exit are provided to and from all these apartments by corridors and stairways, the main connecting link being a cloister running north and south parallel to the nave. East of this cloister is a large open court from which uninterrupted light and air, with a fair proportion of sunshine, enter three sides of the quadrangle at all seasons.

The buildings comprising this compact yet comprehensive establishment bespeak a practical as distinguished from a merely doctrinal interpretation of the Christian religion. Faith and good works are evidently the keynote in this community. Churches conducted on these lines will attract many adherents from among those who believe that temporal well-being is not incompatible with eternal salvation. This center of missionary enterprise is, we believe, an offshoot from Grace Church, that unique but unobtrusive landmark that nestles in the bend of Broadway, punctuating with a full stop the easterly continuation of 11th Street. Though situated in the heart of a heterogeneous population, it is admirably adapted to the wants of the immediate neighborhood and will in time become assimilated with its surroundings. Like the parent church, in its relation to the great commercial highway, this really picturesque settlement is a welcome relief to the eye, in a region where the otherwise unmitigated double tenement holds high carnival.

With a blending of religion and philanthropy, we have here an equally happy combination of things ancient and modern in point of architectural style and treatment. The two pavilions to the left of the picture constitute the hospital, that word being given its original English meaning — literally, a house of hospitality. The needful Gothic feeling has been infused into the contour of moldings, more especially into the design of dormer windows, etc., but this has been done without shutting out the light or in any way marring the cheerfulness of these home-like habitations. Though approached from a cloister, — in this case, merely a convenient covered passage, — they have been adapted to the necessities of every-day life in the waning years of the nineteenth century. But now comes a bold Gothic tower with a loop-holed octagonal shaft on one of its angles that takes the mind back to the Middle Ages. True, the rampart, moat, and draw-

bridge are missing, and the smooth asphalt pavement has not yet been worn by the hoofs of prancing steeds carrying mailed and visored chieftains on missions of knight-errantry; but the low arch in the center, through which a deep recess is dimly visible, suggests the possibility of a portcullis and the clank of armed retainers within the keep. Our train of thought, however, is broken as we approach, for instead of chains, arrow-headed spikes, and oaken bars, we see a partly open gate and hear the sound of music mingled with voices that bid us welcome. Any lingering illusion would now be dispelled by the presence of St. Paul in his hooded niche above this portal (Fig. 9), were it not for his enormous sword, easily mistaken for a Scottish claymore. But this archway really leads to the cloister, thence to all parts of a free and estimable institution.

The second of the two archways is the main entrance to the church; and that ornate apsidal projection, Fig. 10, is known as the Morning Chapel. In the little triangular space abutting the property line, a fountain has been provided, at which thirsty wayfarers are invited to refresh themselves. This invitation is given on the scroll above in a text that may be taken literally as well as figuratively, though in words from Isaiah, "Ho, every one that thirsteth." An aggressive gargoyle on the salient angle of a buttress offers a challenge to every boy in the neighborhood, but, greatly to their credit, they have resisted that form of temptation up to date of writing. This immunity from mutilation may be out of respect for St. James, the son of Alpheus, who occupies a



FIG. 9.

niche on the same buttress, book in one hand, pastoral staff and bottle in the other, likewise the traditional shell on his breast (Fig. 11). In addition to these two saints, there are eight winged cherubs on the four dormers of the belfry, yet we fear that these "angels and ministers of grace" bear but a small proportion to the sinners that pass each day along 14th Street. How different in European cities, especially in those of Spain! In Burgos, for example, Théophile Gautier assures us that on one tower of the cathedral—and it the smallest of three—the stone population must exceed that of flesh and blood inhabiting the town.

The fine rose window in the gable is worthy of more than



FIG. 8.

a passing notice, in view of what was said in THE BRICKBUILDER for December, 1898, on behalf of terra-cotta tracery in general. The present example is a reminder, in miniature, of the great rose window in the west front of Notre Dame, which is rather more than twice its size. From the central hub to the first cusping there are twelve radial lines in both windows; but in Notre Dame an intermediate bar is introduced, dividing the outer periphery into twenty-

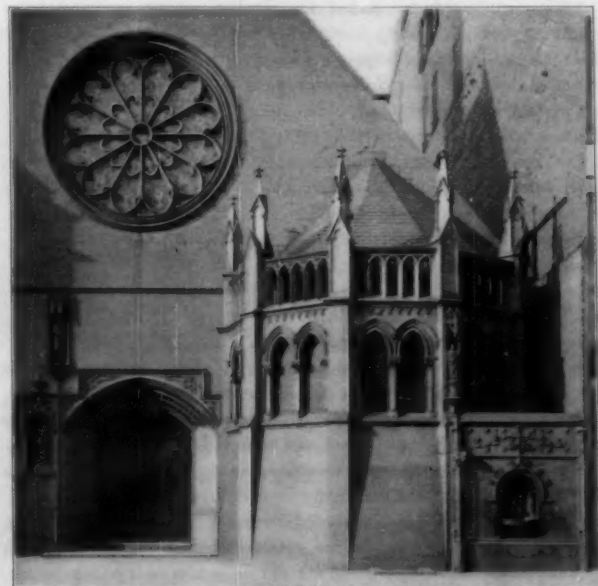


FIG. 10.

four lights. Of course, the sectional area of the bars is in proportion to the immense size of the window, otherwise there would be a want of lateral stiffness, with a consequent tendency to buckle at the joints under a strong wind pressure. In the present case the jointing is arranged in the manner shown at Fig. 12, and the window is entirely self supporting, no iron or other expedient being employed in its construction. All joints are made on the principle of mortise and tenon, with sufficient freedom allowed for the introduction of cement, which, setting in the rebates, becomes the best kind of dowel. Doubts as to the safety of this window were expressed during the early stages of its execution, but these were set at rest when the pieces had been assembled and the last one keyed into position. This window was tested soon after setting in 1894, and found to be quite rigid at all points. Judging from recent examination, it is likely to remain so indefinitely.

The making of a window such as this is not particularly troublesome or expensive, provided the right methods are adopted from the outset. For the tracery but seven different molds are required, out of which eighty-five pieces are obtained. One mold could be made to produce the whole of the thirty-six pieces required for the outer arch, by having the ashlar of sufficient size to contain the largest bond, all the others being wire-cut by hand to a templet, so that the steps would course with the brick walling. In this we get a total of one hundred and twenty-one pieces from eight molds, a fair average in point of repetition, considering that there is but one such window in the building. This is a much higher average than would be possible on some kinds of merely commonplace work, in which comparatively little effect is obtainable at an equal, or even greater, expenditure per cubic foot. We shall have other opportunities of demonstrating the practicability and economy of terra-cotta as

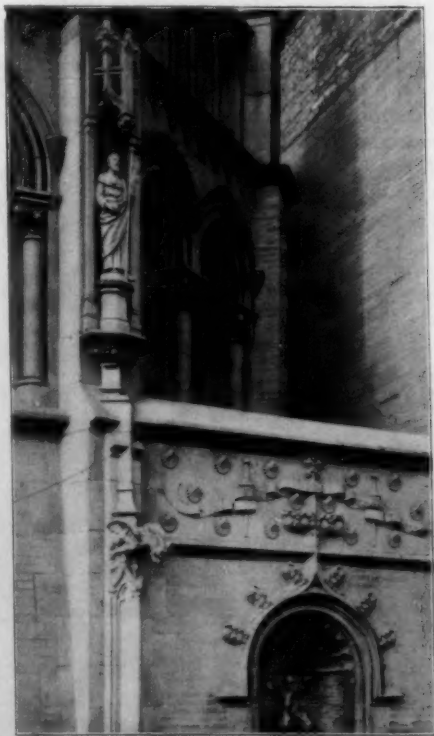


FIG. 11.

against stone tracery, but nothing more conclusive as to that can be adduced than the facts and inferences furnished by the foregoing example.

What has been said in reference to tracery would apply to

every block of terra-cotta in tower, from the arcading of the base to the finials on the dormer gablets (Fig. 13). Much of this work reaches a high degree of elaboration, presenting a series of rather

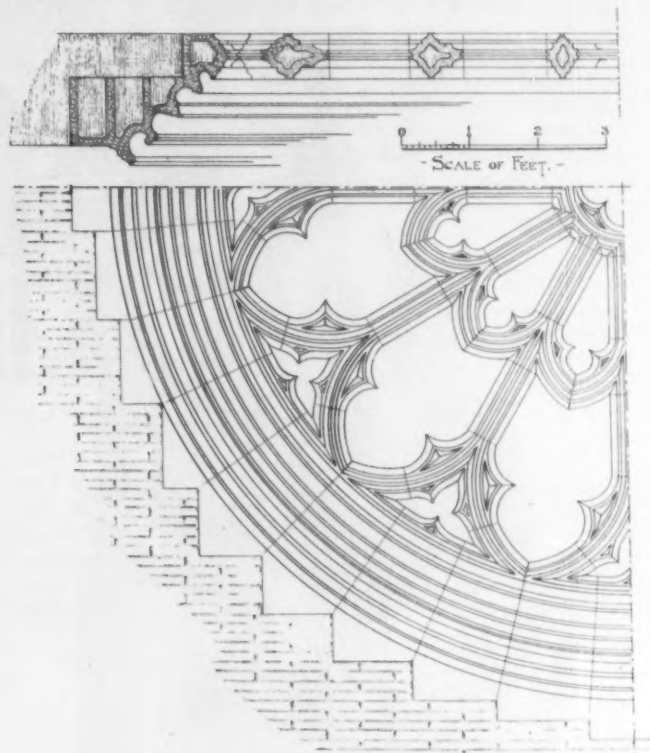


FIG. 12.

interesting problems in jointing and in construction generally. The setting out of work such as this must be conducted on geometrical principles, correct in theory and at the same time conformable to approved workshop practise. If these two elements are embodied in the working drawings, and adhered to intelligently in making the plaster models, the resulting terra-cotta blocks will find their respective places with little, if any, subsequent adjustment. Moreover, the habit of "fitting" the blocks after burning is not one that ought to be encouraged. At best it is a makeshift, made necessary by a want of skilled experience in controlling the shrinkage, or a want of accuracy in the models. There is no reason why either of these wants should be tolerated in an industry that has now passed the infantile stage of development.

In the hands of really competent men there is nothing to prevent the great bulk of a factory's output being shipped from the kiln door direct, without the touch of a chisel. We know that the traditions of a bygone time say otherwise, and though most of the conditions and some of the men have changed places of late years, the ancient fallacy holds its ground from force of habit. If it be true that "custom is our greatest friend or cruellest foe," then there is one here that certainly belongs to the latter category.

Of course, things are liable to happen in the progress of a building that cannot be foreseen, much less provided for before their existence has become known. Mistakes in height and in the size of piers and openings, etc., often occur through careless setting out on the building. The mischief arising from all such oversights or deviations generally falls on the terra-cotta manufacturer, however accurately his work may agree with the data from which all hands had been expected to work. A remedy or expedient must then be resorted to, in which case the service of a fitter comes into immediate demand. We can remember a time when it was taken for

granted that anything in the way of a misfit or misadventure that might happen on a building must be owing to the intractability of the "terra-cotta." In some quarters, and until recently, this

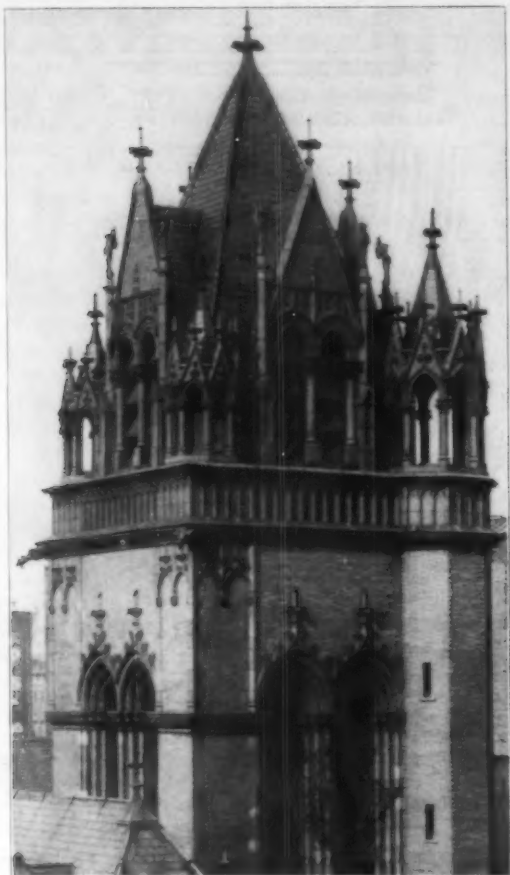


FIG. 13.

stupid notion amounted to an article of faith, the propagation of which was convenient as well as highly fashionable. The absurd maxim is now being gradually exploded, and more often than otherwise the setting drawings that accompany the terra-cotta take precedence over all others, as a safe guide in cases of undefined or disputed measurement.

How far any of these several conditions prevailed in connection with the belfry of Grace Chapel, we are not prepared to say. We can say, however, and that as a result of critical inspection, that every piece fits into its allotted place, that they are free from warping or distortion, and that the color is remarkably uniform throughout. Results such as these should be the aim in regard to every part of a building, be it ever so far removed from the eye, yet one is inclined to regret that work of equal merit has not been given a place of honor around the chancel.

In the matter of iron anatomy it may be stated that a $2\frac{1}{4}$ by 3 T section, fastened to a cross beam below the bell deck, passes up through each shaft of the turrets. This is connected to a similar raking section forming each hip, all of which unite at the apex of roof. In order to prevent spreading, a tie-rod passes horizontally through these ribs a little above the crown of the arch. This, we think, is an improvement on the method usually adopted of inserting the tie-rod at the springing of arch, where it is unsightly and liable to rust,—two disadvantages against which there is no offset.

Brick and Marble in the Middle Ages.

BY G. EDMUND STREET.

CHAPTER X.—Continued.

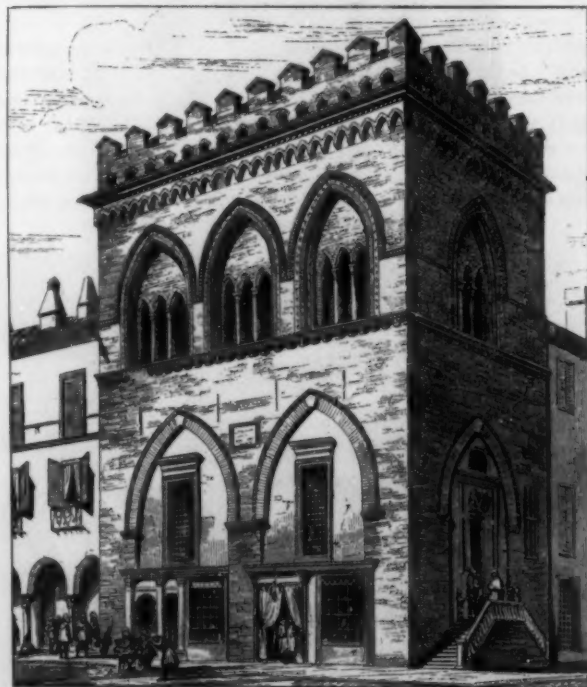
[The photographs A, B, and C are not taken from Mr. Street's work, but are added as additional illustrations of the Italian brickwork.—EDS.]

CREMONA is a city full of interest. The piazza in front of the cathedral is equal in effect to almost any small piazza I know of. On one side is the great marble west front of the Duomo, backed by its immense brick campanile, whose wide fame is proved by the old rhyme, of which the Cremonese are still so proud:—

"Unus Petrus est in Roma,
Una turris in Cremona."

On another side is the Lombard baptistery, a grand polygonal building; on the third, a most interesting domestic building—the palace of the Jurisconsults—and the Gothic Palazzo Publico; whilst on the fourth, a narrow, busy street makes up, by the diversity of colour and costume of the crowd which is always passing along it, for what it wants in architectural beauty.

The cathedral must be first described, and it is rather difficult to do this clearly; but so far as can now be made out it seems much as though it had at first been built upon a simple plan, with nave, north and south aisles, and three semicircular eastern apses; and that then to this, in the fourteenth century, had been added, with hardly any disturbance of the original fabric, immense transepts, loftier even than the nave, and so long and large as to give the impression now that two naves have been placed by some mistake across each other. The groining of the nave is original in its outline, but barbarously painted in sham panelling so as entirely to spoil its effect, but otherwise there is little to notice in the interior, the whole of the church having been converted with the plasterers' help into



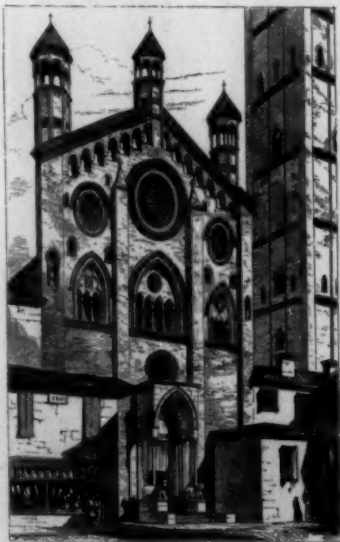
PALACE OF THE JURISCONSULTS, CREMONA.

Renaissance in the most approved manner. The walls are covered with painting, and round the columns, when we were there, were hung great tapestries, all of which gave the building a rich though rather gloomy colour.

The west front (if you can forget that it is a great mask only to the real structure) is rather grand from its large plain surface of arcaded wall; it has been grievously damaged by alterations, but the old design is still not difficult to trace. The doorway is very noble, and the open porch in front of it is carried up with a second stage, in which, under open arches, stand a very fine figure of the Blessed Virgin, and figures of other saints of more modern character on either side of her; above this is a great circular window, whilst the wall on either side of the porch and window is nearly covered with small arcading. The marbles in the wall, where the arcading does not occur, are arranged very regularly in horizontal lines alternately of red and white, each course being about ten inches or a foot high, and divided from the next by a strip of white marble about two or three inches in height. The great rose window is all of red marble, with the exception of one line of moulding which looks like green serpentine. There are some round windows in the lower stage on each side of the entrance, but they are quite modern.

On the north side of the nave rises the Torrazzo, as the campanile is called here—the “una turris in Cremona”—rising about four hundred feet from the pavement of the piazza. Its design is much like that of all the other brick campanili in this district—a succession of stages of nearly equal height, divided by arcaded string-courses, and marked with perpendicular lines by small pilasters, and almost without windows until near the summit. The dark red outline of this magnificent tower tells well against the deep blue Italian sky, which shone brightly behind it when we saw it; and the effect of its immense and almost unbroken outline, rising to such an extraordinary height, is so utterly unlike that of any of our Northern steeples that we need not trouble ourselves to compare them. Both are fine in their way; but the Italian campanili are made up of the reiteration of features so simple and so generally similar that we cannot fairly class their builders with the men who raised in England such a multitude of steeples, all varying one from another, and yet all so lovely.

A door in the east wall of the north transept leads into a small

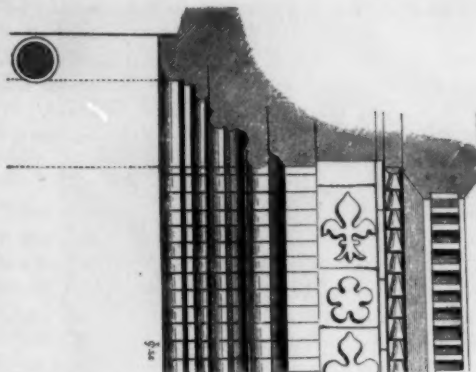


NORTH TRANSEPT, CATHEDRAL,
CREMONA.

courtyard, sacred now to the cathedral clergy, from which the original scheme of the eastern part of the church may be fairly well seen. It appears to have been a stone building treated in the common fashion of Lombard churches, but with buttresses and a passage through them round the apse in front of the windows. There is a modernized crypt under the choir. The side walls of the north transept are seen very well from the same courtyard; they are well arcaded in brick, and entirely concealed from sight elsewhere by the enormous false transept-fronts, the backs of which as seen from here are certainly among the

most ungainly works ever erected for the mere sake of being beautiful.

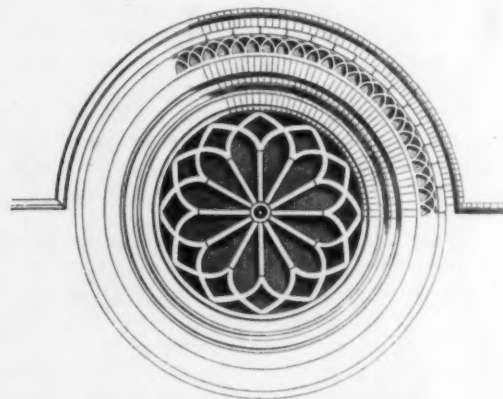
The rest of the exterior of the Duomo is almost all of brick.



WINDOW JAMB, PALACE OF JURISCONSULTS.

The most remarkable features are the two transept fronts, which are certainly magnificent in their detail, though most unreal and preposterous as wholes; they are, both of them, vast sham fronts, like the west front, in that they entirely conceal the structure of the church behind them, and pierced with numbers of windows which from the very first must have been built but to be blocked up. They have in fact absolutely nothing to do with the building against which they are placed, and in themselves, irrespective of this very grave fault, are, I think, positively ugly in their outline and mass. And yet there is a breadth and grandeur of scale about them which does somewhat to redeem their faults, and a beauty

about much of their detail which I cannot but admire extremely. Both transepts are almost entirely built of brick and very similar in their general idea; but, whilst only the round arch is used in the south transept, nothing but the pointed arch is used in the northern, and it is quite curious to notice how very much more beautiful the latter looks than does the former. The filling-in of stilted round-arched windows with ogee pointed tracery and much delicate cusp-



ROSE WINDOW, CREMONA CATHEDRAL.

ing gives the south transept a singularly Eastern look, and it is impossible not to feel that some such influence has been exercised throughout its design. It would indeed be most interesting to find out what this was, but I am not aware that there is likely to be any clue to it. The date of the work is in all probability somewhere about the latter part of the fourteenth century. The detail and management of the whole of the brickwork are exceedingly delicate and effective, surpassing in their way anything I have yet seen.

The putlog-holes are left unfilled, as they almost always are in Italy. The only stone used is in the doorway and the window-shafts, and these last are almost always coupled in depth. The windows are elaborately moulded, and courses of chevrons, quatrefoils, and other ornaments are introduced occasionally as a relief to what might otherwise be the tedious succession of mouldings which are necessarily rather similar. The cusping of brick arches is always managed in the same way; the bricks all radiate with the arch (not from the centre of the cusp), and look as though they might have been built, allowing plenty of length of brick for the cusps, and then cut to the proper outline, the edges of the cusps being almost invariably left square. Some of the terra-cotta arch ornaments and diapers are exceedingly good of their kind. The most remarkable

feature, however, about these transepts is the prodigiously heavy open arcade which runs up the gables under the eaves-cornice—so heavy and so rude-looking, that, taken by itself, it would probably be put down as being of much earlier date than it really is. The façade finishes with three heavy pinnacles arcaded all round, and finished with conical caps.

To the north transept very nearly the same description would apply, save that the doorway is much finer, and entirely of marble.¹



BRICK WINDOW, CREMONA CATHEDRAL.

It is part of the original Lombard church, and has no doubt been taken down and rebuilt where we now see it. The tracery of the rose windows is all finished in brick, and the detail generally is better and more delicate in its character than that of the south transept. In both the bricks are all of a pale red colour, and no dark bricks are anywhere used.

The baptistery—which, as has been said, stands southwest of the Duomo—is entered by a doorway with a projecting porch, whose shafts rest on the backs of animals. It is octagonal in its plan,

built of brick with the exception of the side in which the door is placed, this being of marble, and is very simple in all its detail. There are three altars in it, and an immense erection of masonry in the centre, which, though not open, is evidently a font, amply large for immersion. Each side has three recessed arches on marble columns, above which the whole is of red brick with stone string-courses between the stages. These have corbel-tables under them, which are the only enrichments in the building. All the brickwork is left to view inside, and the light is admitted by a pierced arcade very high up in the walls. The whole is domed over with an octagonal vault of brick, in the centre of which is a small lantern, and the effect is exceedingly fine and solemn, and enhanced very much by the grave sombre colour of the bricks.

Close to the baptistery is a building, called in Murray's Handbook the Palace of the Jurisconsults, turned when I first saw it into a school for a not very polite set of children and teachers, who all apparently felt the most lively interest in my architectural pursuits. It was originally open below, but the arches on which it stood are now filled up. This upper stage is very simple and beautiful, and the whole is finished at the top with a cornice and parapet, with battlements pointed at the top like those in the Torrazzo, and not forked as we have been lately so accustomed to see them. At one end of this parapet a chimney rises above the battlement, which is, so far as I have seen, a unique example of the ancient Italian contrivance for this very necessary appendage.² It is exceedingly good in its detail, and coeval with the rest of the work. There is a simplicity and truthfulness of construction about this little building which make it especially pleasing after the unreal treatment of the great transept-fronts of the Duomo.³ By its side stands the Palazzo Pubblico, out of one side of which rises one of those singular and very tall brick towers, without any openings whatever in its walls, which give such peculiar character to some Italian cities, and of which we afterwards saw good store at Pavia. The whole of the building shews either traces of arcades or perfect arcades upon which the upper walls are supported; they are, however, so much modernized as to be comparatively uninteresting, though enough remains to shew that their detail was once very good. The building incloses a quad-

¹ The two transepts are so very similar, that it seemed unnecessary to engrave my sketches of both.

² The chimneys so common in Venice are ancient, but yet hardly redeemed from ugliness. They are cylindrical, with heads sloping out in a strange fashion, and in the form of inverted truncated cones.

³ This building has recently (1872) been restored, and with not much gain, though the barber's shop which used to occupy the ground-floor has been removed.

rangle, which is rather small, but arcaded on three sides, and opens from the piazza by open arches under the principal façade, and probably dates from the middle of the thirteenth century, the date 1245 being given in an inscription in the courtyard.

There are many churches in Cremona, all more or less appearing to be founded upon the work in the transepts of the cathedral, but generally very inferior to them in merit.

San Domenico has a west front singularly like theirs, but debased in its detail. It has, however, a very fine campanile, lofty, very simple, and pierced with pointed windows in each stage, one above the other. The interior is completely modernized, and not worth notice.

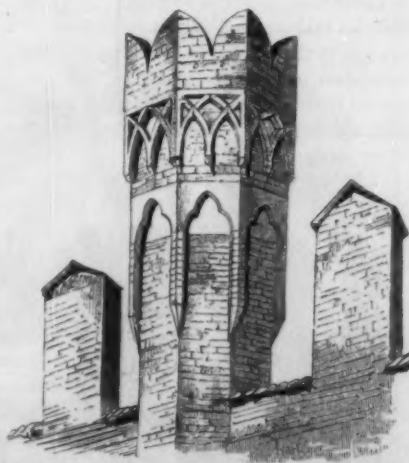
SS. Agostino and Giacomo in Breda is another church of the same class, with a west front which is again a very bad second edition of the cathedral, and which has been horribly mutilated and modernized inside. It is, however, to be remembered gratefully for a most lovely picture by Perugino, representing the Blessed Virgin with Our Lord seated, with SS. Augustine and James on either side. The Virgin is very calm, dignified, unearthly, and very simple and stately. Our Blessed Lord, in her arms, has perhaps rather too much the character of an ordinary infant; and the two saints have more than is quite pleasant of the bend in their figures of which he was so fond; the heads stooping forward, and the knees considerably bent, are a little too evidently straining towards a reverential posture. Such a criticism is a bold one to venture upon with the recollection of so glorious a picture fresh in my mind—one from which I really derived intense pleasure. The date of this very fine work is A. D. 1494.

Sta. Agata is another church which still has its old campanile intact, with round-arched windows, very simple and not large. The church which has been built against it tells its story so well, that at first we all mistook it for a theatre! So much for Classic symbolism.

Another church, dedicated in honour of Sta. Margherita, is a very poor erection of brick, with a simple campanile. One or two other churches we saw with fair brick campanili, which were not otherwise remarkable; and one there was, San Luca, close to the Milan gate, which seemed to be very singular in its arrangements. It had a projecting western porch, with its columns supported on beasts; and at the north-west angle an octagonal building of brick, of exceedingly late date, which appeared to be a baptistery.

I enjoyed the architectural remains in Cremona very much indeed: its rich array of buildings in elaborate brickwork is very striking; and the campanile of the cathedral, towering up high above the many other steeples, combines well with them in the general views, and helps to convert into a fine-looking city what is, perhaps, in its streets and houses generally, very far from being anything of the kind. The way in which the old walls and towers of the Palazzo Pubblico combine with the steeple of the cathedral is extremely fine, a large piazza a short distance to the west of the palazzo affording perhaps the best point of view.

From Cremona we went to Lodi, on our way to Pavia, and had a very pleasant drive. The heat was intense when we started, and the drivers of all the carts we passed were prudently ensconcing themselves in the baskets swung beneath their carts, to escape its



CHIMNEY AND BATTLEMENT, CREMONA.

effects. Throughout the Lombardo-Venetian territory there is a great traffic always going on, and there is a much nearer approach to English arrangements, in the way of harness and tackle, than it is at all usual to see on the Continent; though, indeed, it ought in fairness to be said, that their carts are much more scientific than ours generally are. Any vehicle with more than two wheels is rarely if ever seen; and these two wheels are sometimes of prodigious size—I should say quite ten feet in diameter—whilst the length of the cart from end to end is immense. The extent to which they are loaded is almost incredible, and of course it requires great care in order to make the trim exact; but when loaded, the draught must be light for the weight. It is impossible to talk about horses and carts without thinking of the magnificent cream-coloured oxen which are everywhere doing hard work on the roads and in the fields. They have most magnificent, large, calm eyes; and this, with their great size and slow and rather dignified motion, makes them look very grand. They are always yoked to a pole, which rises up above their heads at the end, and has a carved crosspiece attached to it, against which they press their foreheads.

At Pizzighettone we crossed the Adda, here a very fine and full stream, and then, changing horses, went on rapidly towards Lodi. Leaving the main road, we travelled along a less frequented by road, infinitely more pleasant, and in many places very pretty in-

deed. We followed the course of a small river, which was turned to good account for irrigation; its stream being at times divided



(A) THE LARGE CLOISTER, ABBEY OF MONTE MAGGIORE, SIENA (13TH CENTURY).



(B) WINDOW OF COURT, TOWN HALL, SIENA (13TH CENTURY).

into no less than three channels, in order to water the pasture-land on which are fed the cows whose milk is to produce the far-famed Parmesan cheese. Some part of the road reminded us pleasantly of English lanes and English scenery, but here and there a distant glimpse of the Apennines far behind us, and of the Alps beyond Milan before us, made us aware that we were indeed in Italy.

There is little to be seen in Lodi. It has a large and rather shabby-looking piazza, at one corner of which is the cathedral, whose only good feature is its doorway, which is, however, very inferior to the western doorway of the cathedral at Cremona, to which it bears some little resemblance.

Another church has a Gothic brick front. The real roof is one of flat pitch, spanning nave and aisles; but in the façade the central portion is considerably higher than the sides, so as to give the idea of a clerestory. This is a foolish sham, and unhappily only too common in late Gothic work in Italy. The centre division of the front is divided into three by pilasters, which are semi-circular in plan. In the central division are a door and a circular window, in each side division is a pointed window, and a brick cornice finishes the gable, crowned with five circular brick pinnacles.

Another church in Lodi has a very beautifully painted ceiling; this has been engraved by Mr. Grüner, but unluckily I did not know of its existence until I returned home; it seems to be an admirable piece of colour, and to be well worth careful study.

There seemed to be nothing else worthy of notice in Lodi; but, as in duty bound, we walked down to the bridge,—a rough, unstable-looking wooden erection over the broad rapid Adda, with nothing about it to recall to mind the great event in its history, its passage by Napoleon in 1796.

We left very early in the morning for Pavia: our way led us through a country most elaborately cultivated, and irrigated with a great display of science and labour; every field seemed to have some two or three streams running rapidly in different directions, and the grass everywhere was most luxuriant. No view, however, was to be had on either side, as the road found its way through a very flat line of country, and all the hedges were lined

with interminable rows of Lombardy poplars. It was a country which would have done more good to the heart of a Lincolnshire farmer than to that of an architect!

The only remarkable building passed on the road was a castle at Sant' Angelo; a great brick building, with square towers set



(C) OLD WELL NEAR SIENA (13TH CENTURY).

diagonally at the angles. The walls were finished with a battlement of the Veronese kind, and there were several very good early pointed brick windows with brick monials in place of shafts. A campanile, detached near one angle, has fine machicolations in stone, now, however, partly destroyed. The effect of the whole building was very grand.

CORRESPONDENCE.

EDITORS THE BRICKBUILDER:—

Dear Sirs:—Please give me your opinion and suggestions in regard to the manner of carrying the brickwork both above and on the face of the girder as shown in the enclosed sketch (Fig. 1). The specification will call for the work in Portland cement mortar with the joints raked out and repointed with the finishing mortar. The weight on the beam is less than thirty tons—20 ft. 8 ins. span. Is the anchoring of the brickwork to face of the beam the best that can be got?

We do not think that the construction shown by our correspondent is quite safe, for the reason that the bearing of the brickwork on the lower flange of the beam will be only about $2\frac{1}{4}$ ins., and what is more objectionable, the bearing (beam flange) has a slope or angle of 2 ins. in 12 ins., so that we think it will be quite impossible to hold the bricks so that they will not slip on the beam. The $\frac{1}{4}$ in. plate on the top web would offer very little resistance to the brickwork above, and we

are inclined to think that a large proportion of the weight of the outside facing of the wall will be transmitted to the lower flange of the beam. In our opinion, the $\frac{1}{4}$ in. plate would be of practically no value in supporting the wall, except as a foundation for starting the first courses.

We would recommend that instead of a single beam, a beam

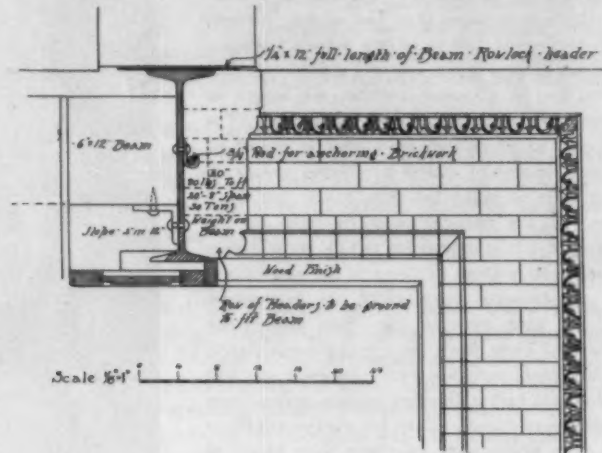


FIG. 1.

and channel, connected with bolts and separators, be used, as in Fig. 2. These have about the same strength as the 20 in. beam, and weigh a little more, but give much better support for the wall. Owing to the molding on the bottom brick, the bearing has to be limited, but it is perfectly level, and by riveting a small angle to the channel at A, so as to just catch the top of the bottom brick, it will be impossible for it to tip. By bonding the bricks above the beam, as shown in the sketch, but very little weight will be imposed on the bottom plate. It would be still better construction if the back of the channel could be set within 4 ins. of the face of wall, but that would necessitate different moldings.

If it is deemed necessary to adhere to the single beam, we would recommend that a 4 by 4 in. angle be riveted to the outside of the beam, opposite the inner angle, and that the brickwork be brought on to these angles on both sides of the beam, and the plate on top dispensed with. This would necessitate substituting terra-cotta, wood, or metal for the lower or inner molded course. Terra-cotta

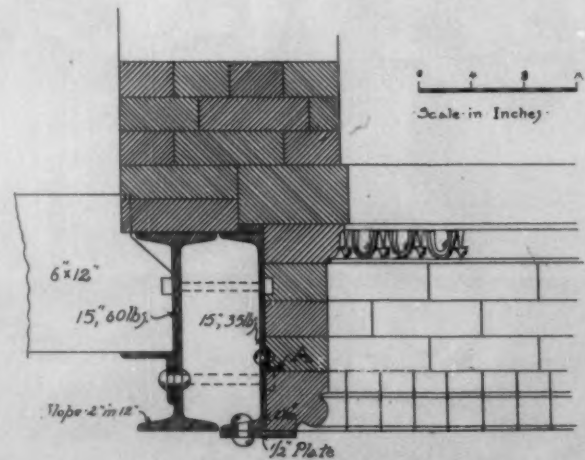


FIG. 2.

can be hung almost anywhere by means of interior rods and hooks, but to drill the bricks and hang them in place is impracticable if not impossible.

EDITORS.

Fire-proofing.

THE SERRATED ARCH.

BY HENRI G. CHATAIN, E. E.

IN a previous article a new style of terra-cotta arch, the "serrated arch," was partially illustrated, and is here shown and explained at greater length.

The primary object of this arch is to furnish a construction possessing practically the same strength as a segmental arch of the same depth and rise, without the disadvantages of the latter. The rise is obtained by using a skewback and key with a batter of 2 ins. to 1 ft., and voussoirs with a batter of 1 in. to 1 ft. The difference between these batters gives to the arch a rise of 1 in. per foot of half the span, or one twenty-fourth of the total span. In setting these arches the centers may be of the ordinary type generally used for "flat arches," hung either from the beams directly, or from joists across the top of the beams, with the addition of a beveled strip laid on each stringer. This strip can be used for different spans, as the angle of rise is always the same.

A careful examination of the cuts here shown will give an idea of one of the principal advantages this arch possesses over a segmental arch in having the ends of all the blocks, or voussoirs, parallel, thus giving mortar joints of even thickness at the top and bottom. This also applies to the skewbacks and keys. This is seldom the case in a segmental arch, as blocks battered on both ends to fit a certain rise and span seldom fit any other span with any degree of nicety. The combination of side-construction skewbacks and keys and end-construction voussoirs used in this arch has many advantages. A side-construction skewback can be made with a protecting flange beneath the beam, thus doing away with the soffit tile, and moreover presents a smooth, flat surface against which the abutting voussoir can be well mortared. In placing the key, its smooth surface materially aids the mason in securing a good and uniform joint.

As stated in a previous article, the line of greatest pressures in a "flat arch" approaches the upper and lower sides at the key and skewbacks respectively, and therefore it is more necessary to have good firm joints at these points than at any other places in the arch; and as these arches have such a small rise, the same rule applies. It will also be noticed that the keys and skewbacks are made exceptionally heavy and the material distributed so as to present the greatest resistance where it is most needed. The webs of the skewbacks are designed with a slope, which is most efficient for an average span, but which is near enough for all practical purposes at the most extreme spans to which the arch is applicable.

In the matter of strength these arches compare very favorably with segmental arches made of side-construction blocks. An end-construction block properly set in an arch has its entire section available for resisting compression, as the shells and webs extend from end to end, while a side-construction block has only the horizontal webs and the upper and lower shells in direct compression, the remaining parts serving only to hold the block together and

to resist diagonal strains, due to the resistance to bending at the joints.

A casual inspection might lead one to infer that a long span uniformly loaded would have a tendency to buckle downward, say half-way between the center and either end, but it must be remembered that if a circular arc can be drawn inside of the middle third of an arch, it will be stable, if uniformly loaded. It is always assumed that the haunches are filled with concrete to at least level with the highest point of the arch, so that the depth of the arch at any point may be taken as the sum of the depths of terra-cotta and concrete at that point, as the solid section of light (cinder) concrete may be safely taken at the same compressive resistance as a section of the hollow terra-cotta block of the same dimensions. Of course every inch of concrete above this adds materially to the strength of the construction, but the safest plan is to design an arch to safely carry the desired load, and to depend upon the extra concrete to withstand any unforeseen shocks or excentric loading.

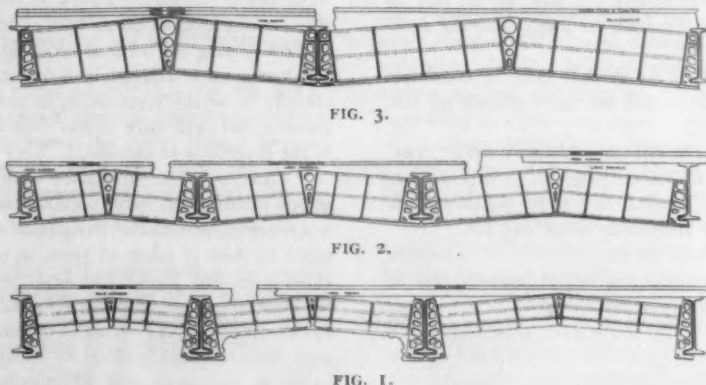
"Flat arches" act as braces in a building to a certain degree, and these arches may be depended upon to the same extent, as it would be a practical impossibility to buckle them by pressure on the ends, owing to their slight rise. Although intended more for constructions requiring great strength, such as the floors of warehouses, breweries, etc., these arches are perfectly applicable to any buildings not requiring such strong construction, being so light for their strength.

The serrated ceiling is an innovation which it is believed will be appreciated by the architect and owner, combining greater strength than a "flat arch" of the same weight, with a most pleasing effect to the eye. A serious objection to the segmental arch is the irregular ceiling effect where a floor is divided into small rooms, as the partitions may divide an arch so as to mar the whole effect. These serrated arches, having only a very small rise, obviate this difficulty entirely, for, as in the case just cited, the ceiling may be plastered level wherever considered necessary, and at a small extra cost. In places where the

plastering is very thick, large-headed iron spikes driven into the arch, leaving enough projection to be thoroughly embedded in the plastering, will insure a good bond and obviate the danger of the ceiling falling in consequence of its extra weight.

Fig. 1 shows a 6 in. raised serrated arch at 4, 5, and 6 ft. spans, capable of safely sustaining loads of 612, 434, and 330 lbs. per square foot of floor, respectively. The weight of the terra-cotta arch alone is about 20 lbs. per square foot of floor. The dotted lines show the position of an 8 in. arch, and in the central span is shown the effect of the finished ceiling. In Fig. 2 a 12 in. arch is shown at 4, 5, and 6 ft. spans, capable of safely sustaining loads of 1,357, 931, and 688 lbs. per square foot of floor, respectively. The weight of the terra-cotta arch alone is about 30 lbs. per square foot of floor.

Fig. 3 shows a 15 in. arch at 7 and 9 ft. spans, capable of safely sustaining loads of 700 and 461 lbs. per square foot of floor, respectively. The weight of the terra-cotta arch alone is about 36 lbs. per square foot of floor. Figs. 2 and 3 show the regular serrated ceiling with several different styles of flooring, all of which are equally applicable. In this arch, as in an end-construction "flat arch," any sections of voussoir may be used, the strength varying directly as the cross sectional area in arches of the same depth.



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Masons' Department.

SOME EVILS OF PRESENT SYSTEMS.

BY JOHN LYMAN FAXON.

AS to the form of contracts in use, they are, naturally, of somewhat varied phraseology, though aiming at like results; and in this paper I will briefly comment on two, which fairly illustrate the extremes of such instruments, of extended form: first, as to the "uniform contract" as approved by the National Association of Builders and the American Institute of Architects.

"ARTICLE I. The contractor under the direction and to the satisfaction of Blank & Blank, architects, acting for the purposes of this contract as agents of the said owner, shall and will provide all the materials and perform all the work mentioned in the specifications and shown on the drawings prepared by the said architects for the, etc., which drawings and specifications are identified by the signatures of the parties hereto.

"ART. II. The architects shall furnish to the contractor such further drawings or explanations as may be necessary to detail and illustrate the work to be done, and the contractor shall conform to the same as part of this contract *so far as they may be consistent with* the original drawings and specifications, referred to and identified, as provided in Art. I. It is mutually understood and agreed that all drawings and specifications are and remain the property of the architects."

I have italicized the words "*so far as they may be consistent with*," because it seems to me that therein lies much chance for controversy, which should be avoided.

Who is to determine whether or not the architect's detail drawings or explanations *are* consistent with the originals or with the contract? the contract does not say, whether it is to be the owner, the contractor, or the architect, or by arbitration under Art. III.

The owner may claim that he or the architect is to so determine or that it is to be by arbitration, according to the owner's bias of thought at the time; the contractor may claim that he or the owner is to so determine, or that it is to be by arbitration, according to the contractor's bias of thought at the time: the architect may claim (and rightly) that he is to so determine, for, having prepared the plans and specifications, the architect *is the only person who knows* just what the true intent and meaning and consistency is. In short, Art. II. is vaguely indefinite — contracts should be definite, as far as possible.

Art. III. provides for arbitration by "three disinterested arbitrators"; but as things go, it would be rather difficult, I imagine, to secure *disinterested* arbitrators, in the best sense of that term: each party would naturally select one who would be friendly to his interests, and with the probability that the arbitrators would have little or no knowledge of the legal aspects of the matter. In case of such arbitration, it should be provided that the referee shall consist of an architect, a lawyer, and a contractor.

Arts. VII. and VIII. provide for arbitration, on matters of much less importance than under Art. V. — yet Art. V. provides for determination by the architect, without appeal. Surely, if the architect is competent to act under Art. V., he is also competent to act under Arts. II., III., VII., and VIII.

Art. VIII. provides that "the owner agrees to provide all labor and materials not included in this contract in such manner as not to delay the material progress of the work, and in the event of failure so to do, thereby causing loss to the contractor, agrees that he will reimburse the contractor for such loss; and the contractor agrees that if he shall delay the material progress of the work so as to cause any damage for which the owner shall become liable (as above

stated), then he shall make good to the owner any such damage. The amount of such loss or damage to either party hereto shall, in every case, be fixed and determined by the architect or by arbitration, as provided for in Art. III. of this contract."

In respect to labor and materials, Art. VIII. comes into conjunction with Arts. II. and III. *Who* is to determine as to *what* labor and materials, and just *how much*, the owner is to provide, and the consistency thereof, in respect to the contract? the contract does not say, except in so far as damages for delay are concerned, and that by architect or arbitration; but it does not say *who* is to determine as to whether it is to be by the architect or by arbitration.

This form of contract is at cross purposes, and conducive to disagreements; it says in Art. I. that the labor and materials shall be satisfactory to the architect, and then goes on to practically provide for some other satisfaction. The contract nowhere says that the *building*, as a whole, shall be satisfactory and acceptable to the architect, or that the building, as a structure, shall be a complete and perfected one of its kind, subject to the specific things which the owner is to provide.

The bias of the uniform contract is distinctly in favor of the contractor as against the owner and architect.

The "Contract" of the city of Boston goes to the other extreme, and is distinctly in favor of the owner, as may be noted by the following extracts: —

"ARTICLE I. The contractor, with materials and workmanship of the best quality, shall, for the City of Boston, Mass., do the work described in the specifications of the work at the end of this contract, conforming so far as they go to the provisions of this contract, and completing the work as required in said specifications; and if the contractor is delayed in doing the work by anything for which the city is legally responsible, he shall have no claim for damages therefor, but shall have further time for completing the work equal to the time he is so delayed.

"ART. 2. The contractor shall permit the chairman and the person provided for in the specifications of the work to be the architect therefor, hereinafter designated as architect, and persons designated by them or either of them, to enter upon and inspect the work at all times and places, and shall provide safe and proper facilities for such entry and inspection; shall conform to all determinations and directions of [the architect relating to the commencement of the work, the order and manner of doing the work, the proper interpretation of the plans and specifications, the suitability, amount, quality, and value of everything done or used on the work, and the date of the completion of the work, or relating to any other question which may arise relating to the method and materials used in, and the time of doing the work, and the architect shall be deemed the referee of both parties to make such determinations and directions.

"ART. 3. The contractor shall take all responsibility of the work, and bear all losses resulting therefrom, or from the amount, character, or method of doing the work, or from the nature of the land in or on which the work is done, or from the weather, elements, or other cause; shall not take any advantage or make any claim for damages on account of any discrepancy or error in the specifications or plans, but shall report the same to the chairman as soon as it comes to his knowledge; and shall, when requested by the architect, dismiss any employé, and not allow to be again employed on the work any employé so dismissed.

"ART. 4. The contractor shall assume the defense of all claims and suits against the city, its agents and employés, or any of them, arising from the use in doing the work, of any invention, patent, or patent right, material, labor, or implement, or arising from any act, omission, or neglect of the contractor, his agents or employés, in doing the work; and shall indemnify and save harmless the city, its agents and employés, from all such claims and suits," etc., etc.

There is no form of contract with which I am familiar, which

requires and depends so much upon the intelligence, experience, and integrity of the architect for fair, equitable, and just determination; yet this form goes to some lengths which are disadvantageous to the city, in the majority of cases, in encouraging to a more or less extent the present tendency to gamble in estimating; for it is as much against the city's interest for work to go for an excessively low price as it is for work to go for an excessively high price, and leads sometimes, logically and unavoidably so, to determinations by the architect which appear to be to the contractor unreasonable and arbitrary, yet clearly justified by the contract.

The civic buildings of a large and important city should be regarded as the most desirable works to be obtained, and there ought to be a strong, healthy, civic spirit among contractors to see that such buildings be erected in the most thorough, substantial, and perfected manner, with the polish of fine workmanship, to the end that such buildings may reflect, not only the intelligence and liberality of the citizens, the professional acumen of the architects, but the ability, integrity, and pride of the builders.

This last desideratum can be secured by the most reputable and responsible contractors taking a more active interest in the city work than has been the rule in the past.

Leading contractors complain that they have no chance in securing such contracts under the present system of advertising for bids, under which any self-styled "contractor," particularly those with "gumption" and those who "mortgage the job" to get a certified check, are allowed to bid for the work. This is largely so, and I see no way to better present conditions in this respect, except to put civic work upon the same basis as private work, *i. e.* by direct invitation to selected contractors to bid on the work. There is no good reason why this procedure should not be in vogue, and there are many reasons why it should be, and the city would be the gainer thereby.

It is argued, principally by "contractors," that "a citizen has a right to public work," and as much profit as possible out of it; but this proposition does not appear to be either logical or conclusive. In respect to securing and executing contracts, defects and abuses exist, which may be summarized under the following heads:—

- (a) Lack of technical knowledge in accurate reading and understanding of plans and the terminology of specifications and contracts.
- (b) Guessing at cost per square foot or per cubic foot.
- (c) Too many figures made in estimating.
- (d) Deliberate omission to estimate on some part of work, or estimating for different quality or kind of work than that specified,— "to get the job" or "to get extras."
- (e) Taking estimates of irresponsible "subs.," and not using responsible "subs." at all in making up bids.
- (f) Dickering in "subs." after award of contract.
- (g) Mischievous hustling of material agents.
- (h) Attempted evasion of contract obligations.
- (i) Indisposition to accept fair prices for "extras," or to allow fair prices for "omissions."
- (j) Lack of system in estimating and execution of work.

In respect to (a), the average contractor is lamentably deficient in the architectural and technical knowledge, which should be a part of the stock in trade of all who undertake contracts for the erection of buildings. In acquisition of the requisite knowledge, the architect works from the concrete to the abstract: from known facts to the scientific application of them, the architect needs to be ahead of his time; his principle of action is subjective, not objective; and his duty to his profession and to the public is, in its largest sense, greater than that to his client. It is this broader, ethical culture which contractors fail to understand, and which leads contractors to think of architects as "visionary, impractical, and cranky." On the other hand, the contractor works from the abstract (the plans)

to the concrete (the building and profit); nevertheless, it is necessary that the contractor should have the same education as the architect, to the end that mutual understanding may be upon a higher plane.

Contractors, as a rule, do not study the history of architecture, or the scientific applications of architectural engineering: given the requisite training, a contractor would be able to read a set of plans and specifications as easily and as intelligently as a book in good, clear, precise English. Plans are merely language graphically expressed. But as things are, not one contractor in fifty is at all familiar with the different styles of architecture and the characteristic and essential details; not one in fifty appreciates or understands the artistic, individual differentiation of an Erechtheion, Palladian, or Scamozzi Ionic capital; or Byzantine, Roman, or Renaissance Corinthian; or Renaissance, Francis I., or Gothic style, *per se*: such nomenclature is meaningless to the average. Familiarity with them would, when estimating, tell a contractor, at a glance, what the plans represented and what measure and elaborateness of detail would be needful and required to express the general design, and would enable him to estimate accordingly.

I am quite of the opinion that 99 per cent. of all complaints of contractors, against architects, of "crowding on details" is the fault of the contractor, and due to lack of needful training, and quite of the opinion that it is desirable and needful for contractors to pursue the same course of training at some established professional school as that which is the basis of the trained architect, and with such training honest work at a fair price would be the rule and not the exception.

In regard to (b), I know from experience and observation that the average contractor makes too many figures in estimating, and gets befogged in a maze of calculations and sheets. The science of estimating is to aim at results with the least expenditure of time, the easiest method and accuracy. I will illustrate some examples of estimating in a following paper. Also in respect to (c).

In regard to (d), the practise is altogether too prevalent and should be discarded. The ethics of the matter is summed up in the broad and general principle of strictly honest work at a fair price, and I doubt if the reputable contractor will question the principle, and I am well convinced that the reasonable client will not, for in twenty-five years' practise, I have never had a client (except one, so far as I can remember) who has asked me to "beat down" a contractor, after I had explained the difference and risk of poor work at a low price and best work at a fair price.

It is one of the unfathomable mysteries why any contractor will estimate for a poorer quality of material and workmanship than that called for in specifications, or expects, after he has got the job, to be allowed to provide from 5 to 10 per cent. of inferiority in quality of work required. The arguments offered that something else is "just as good," or that "there isn't any profit in the job" have no bearing on the case. The practise is dishonorable, and the architect has no concern with profit or loss to the contractor. It is the business of the contractor to execute the contract as determined by the architect, and contractors should realize that the courts hold them to the contract, whether they are "supervised" or not.

I have been consulted time and again by contractors, in respect to requirements of contracts and specifications, other than those from my hand,—cases in which the contractors considered that they were called upon to comply with "excessive and unreasonable" directions, and nine times out of ten the contractor has been at fault, because the contractor failed to grasp the meaning of the contract in its entirety.

In case specifications are vague or ambiguous, contractors should ask the architect for definite statements regarding such points before estimating, and it is a good practise for the architect to post his answers, for the information of all contractors prior to closing of bids. The contractor had better lose the job than get it at too low a figure and then have misunderstandings, lack of profit, and hard feelings afterwards.

Brick and Terra-Cotta Work in American and Foreign Cities, and Manufacturers' Department.

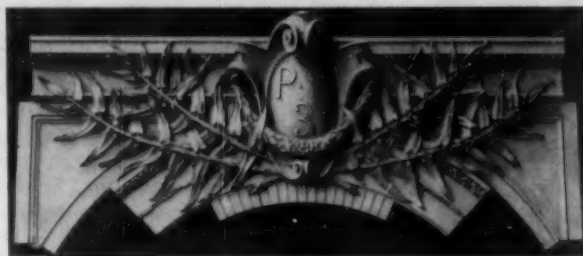
NEW YORK.—There is every evidence now of a wave of prosperity in every line of business and, as a natural sequence, among architects and builders. Although it costs more to build now than it did last fall, and the prices of all building materials are higher, there is a vast amount of new work under way and on the boards. For the capitalist who is not absolutely dependent upon quick returns on his investments, and who took advantage of the low prices of materials and labor last fall, there are big profits in sight; but the average investor undoubtedly was wise in waiting until this spring, when money is easy to borrow if needed. The steady supply of small sales has kept brokers busy in all parts of the city, a feature that has continued uninterruptedly now for a long period, but veritable sensations in the way of big investments have made the reports of the market additionally interesting almost every day. And the end is not yet.

The St. James Building, by Bruce Price, one of the finest office buildings in the up-town district, and a fine example of the use of brick and terra-cotta in office buildings, has been sold to the Security Trust and Life Insurance Company of Philadelphia for \$2,725,000. The company will occupy two floors and rent the remainder of the building.

The old Real Estate Exchange Building, a landmark downtown, has been sold to a syndicate composed of John E. Crimmins, Hugh J. Grant, and others. It is expected that a large office building will be erected on the site, which is an unusually fine one.

Among the more important items of new work might be mentioned: C. P. H. Gilbert is preparing plans for a five-story brick and stone dwelling, to be built on West 53d Street; cost, \$50,000. The same architect has also prepared plans for a five-story stone and brick fire-proof dwelling, to be built on Fifth Avenue, corner 80th Street; cost, \$130,000. Albert E. Parfitt has planned a five-story brick fire-proof store and loft building, to be built on Fulton Street, corner Bridge Street, Brooklyn; cost, \$75,000. The College of St. Francis Xavier is going to erect a four-story brick and stone parochial school building on West 17th Street; cost, \$100,000. James B. Baker has planned a brick and stone Training School for Nurses in connection with the Post Graduate Hospital, to be built on 20th Street, near Second Avenue; cost, \$100,000. Neville & Bagge have prepared plans for a four-story brick and stone convent, to be

built on 152d Street, near Amsterdam Avenue; cost, \$50,000. L. C. Holden has planned a seven-story brick factory for the Hammond Typewriter Company, to be built on East 69th Street; cost, \$50,000. Israels & Harder have planned a five-story brick and stone tenement building, to be erected on Eighth Avenue; cost, \$20,000. Schneider & Herter are preparing plans for three six-story brick flats, to be built on East 12th Street; cost, \$85,000. Pollard



DETAIL OF GATEWAY TO PUBLIC SCHOOL NO. 3, NEW YORK CITY.

Executed in terra-cotta by the Standard Terra-Cotta Company.
C. B. J. Snyder, Architect.

& Stemain have planned two five-story brick flats, to be built on First Avenue, corner 93d Street; cost, \$40,000. Franklin Baylies has planned an eight-story brick and terra-cotta store and loft building, to be built on East 20th Street. Clinton & Russell have planned an eighteen-story fire-proof office building, to be erected for the American Exchange National Bank on the corner of Broadway and Cedar Street.

CHICAGO.—The advent of warm weather has brought some encouraging increase of activity in building notwithstanding existing and threatened labor troubles.

Contracts have just been let for the erection of the new ten-story "Cable Building" on the southeast corner of Wabash Avenue and Jackson Boulevard. The style is the simple-severe, commercial type with very large glass areas; wide bays, two on the front and five on the side, and terra-cotta covering with rather small and flat detail. The cost given is \$165,000.

Factory building continues active; the largest recent undertaking in that line being the immense new factory building for the McCormick Harvester Company, at Western Avenue and the South Branch, costing over \$200,000.

The success of another big undertaking is fully assured by the purchase of the 70 ft. of frontage adjoining the old Libby Prison site on the south. The newly acquired property added to the latter premises on Wabash Avenue furnishes the required space for the new colosseum. Upon the south end will be built an annex with accommodations for horses and menagerie animals on the lower floors, and banquet, press, and committee rooms above for use during conventions, balls, or big social gatherings. The main building will be 300 by 165 ft., and will seat, including the main gallery, over 10,000 people. For circus and carnival entertainments the gallery seating can be extended to the main floor. The building will be strictly fire-proof and will cost, according to present estimates,



IVY CLUB HOUSE, PRINCETON, N. J.
Cope & Stewardson, Architects.

about \$250,000. The architects are Frost & Granger.

The Marshall Field Wholesale Warehouse, famous as one of the late H. H. Richardson's most successful buildings, is having another floor put in according to the original plans, under the direction of Messrs. Shepley, Rutan & Coolidge. No visible change will be made in the exterior, as this upper floor is to be lighted from above. When the daily papers first reported the fact that another story was to be added to the building, there was a great deal of apprehension among local architects lest the dignity and perfect proportions of this splendid pile might be seriously impaired.

Labor troubles have been affecting suburban building operations. One Chicago architect, whose particular field of work is Evanston, had nine special policemen sworn in to protect as many buildings in Evanston and in Lake Forest. No damage was done by strikers except in one building.

A new organization, at present limited to a membership of twenty, and known as the Architects' Guild of Chicago, has been recently formed for the purpose of promoting the interests of architecture and the allied arts, for mutual encouragement and benefits, and for professional comradeship among the younger and more enthusiastic practising architects whose professional training and aspirations make them congenial. The members dine together every fortnight, and informal talks and discussions over questions of professional interest serve to make these little symposiums helpful as well as delightful, and the society intends to bear an active and aggressive part in making Chicago more beautiful,—or perhaps it might be better to say, for the present at least, less ugly. One of our greatest curses is dirt,—dirt in the air, dirt in the streets, dirt all over our drawings, and dirt all over our buildings, until bronze and light sandstone are all of a color.

The Chicago *Record* is making a strong fight for cleaner streets, but the police continue to be very negligent in the matter of arresting offenders who sweep or throw rubbish into the streets and alleys. There are laws enough making for clean streets, but public sentiment has grown very lax; in fact, there seems never to have been a very strong public sentiment back of them. When the people demand clean streets and smokeless chimneys, as they recently demanded their right to control street railway franchises, then we may hope for



ENTRANCE TO THE BREWERS' EXCHANGE, BALTIMORE, MD.

Terra-cotta executed by the New York Architectural Terra-Cotta Company, Joseph Evans Sperry, Architect.

the first step toward having a beautiful city.

PITTSBURGH.—With the beginning of May we are threatened by a general strike among the carpenters, brick masons, plasterers, and tile setters; whether the general contractors will grant the increase in wages is as yet not known, but it is to be hoped that building operations, which now promise so much in contrast with the past few years, will not be seriously retarded. But it is a question whether the increase in wages, coupled with the rapidly increasing price of building materials, will not deter many from building. However, at present business seems to be good in all the offices and there is a general demand for first-class draughtsmen.

The Pittsburgh Fire Department has recently had a rather unusual fire to fight. Parts of the city are built over deserted coal mines; when these were worked mining was not done as thoroughly as at present, and large quantities of coal were left in them. One of these mines caught fire, and after smoldering for a time broke through the surface in several places in the thickly settled parts of the city.

Shafts were sunk around it and the fire smothered, and now it is proposed to fill up these shafts to prevent any such occurrences in the future.

The most important event in the building world here during the past month has been the announcement by Mr. Carnegie that he had placed \$1,750,000 in the hands of the trustees of the Carnegie Institute to be used in building the proposed addition. There seems to

be no reason why the work should not be soon commenced if the city will provide the necessary site, but the land in the rear of the present building must be first condemned and bought in by the city; at present there is a bill before councils to provide by an issue of bonds the money necessary for this and for the removal of "the hump" on Fifth Avenue, which was mentioned several months ago. Mr. Carnegie has also promised sums varying from \$50,000 to \$100,000 to a number of towns in the vicinity for public libraries. In a competition recently held for one to be built at Carnegie, Pa., the design of Struthers & Hannah was placed first. It is to cost about \$100,000.

Among items of interest recently noted are: F. J. Osterling has been awarded the first place in a competition for a new court house at Wilkes-



TERRA-COTTA GROUP FOR PUBLIC BUILDING.
Executed by the Conkling-Armstrong Terra-Cotta Company.



RESIDENCE AT PITTSBURGH, PA.
Roof of Akron Vitrified Tile, made by J. C. Ewart & Co.
George S. Orth & Bros., Architects.

barre, Pa. It is to cost \$500,000. Plans for a new school building at Homestead have also been prepared by the same architect. W. J. East has prepared plans for a large business block. Edward Stotz has made plans for a new church to be built at West Newton, and also for a block of stores to be built at Braddock. Geo. S. Orth & Bros. have several brick houses to be built at Sewickley.

W. Ross Proctor is at work on what is probably the largest country house near here. It is a brick and half timber structure, 155 ft. across the front, and with the large formal gardens which will be laid out in connection with it, it will form one of the most pleasing country places in the vicinity of Pittsburgh. Mr. Proctor also has a large city house at Albany, N. Y.

Alden & Harlow have recently let the contract for a five-story hotel and apartment house in the East End, to cost \$75,000, and also for a \$10,000 stable, both for Mr. R. B. Mellon. They are at work on three large houses at Sewickley and one at New Brighton, and also are preparing plans for the Mt. Washington branch of the Carnegie library, to cost \$25,000. S. F. Heckert has planned the St. Michael's Orphan Asylum and also the Mt. Oliver Convent. Rutan & Russel are the architects of a large brick residence at Sewickley. C. M. Bartberger has prepared plans for the twenty-seventh ward school, cost, \$65,000, and for a five-story business block for The Ward-Mackey Company. F. C. Sauer has planned a new three-story school at Tarentum, Pa. Vrydaugh & Wolfe have let the contract for a church at Wilkinsburgh, to cost \$75,000. There are rumors that Mr. H. C. Frick will build a \$200,000 residence in the East End.

MINNEAPOLIS.—Probably the largest single item to report this month is the new Chamber of Commerce, which is now assured. The plan as at present outlined contemplates a building 181 by 155 ft., nine stories high, of stone, brick, and terra cotta, thoroughly fire-proof and modern throughout. The estimated cost is \$800,000.

The corner immediately opposite the site of the new Chamber was recently purchased by a syndicate. They will improve the corner at once with a modern fire-proof office building about same height as the

new Chamber. The corner diagonally across from the new Chamber is owned by William Deering, of Chicago, who is understood to stand ready to make improvements equal to the others when the proper time arrives. The result of these improvements is bound to put new energy into business improvements in Minneapolis, which have been lagging for several years.

Several years since an experiment was made looking to the establishment of a down-town "mission," to care for the homeless and unfortunate men. They now propose the erection of a new brick building adapted especially to their growing needs. It will probably be 66 by 157 ft., and some five or six stories high, modern throughout, and such a place that the clerk or traveler who cannot afford the high-priced hotels will be glad to avail himself of the clean and respectable hostelry. It will do what the "Mills Hotels" of New York are doing and more too. It will care for men's moral and spiritual wants as well as the physical. As it has paid its way thus far, there seems no reason to suppose it will not continue so doing.

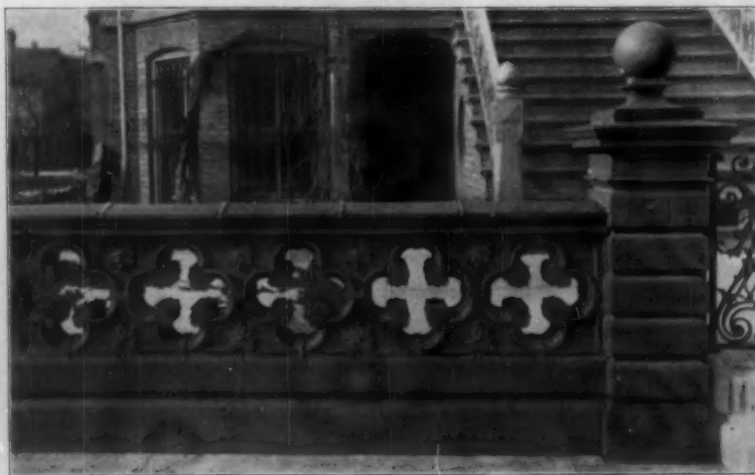
The city will spend about \$250,000 on her schools during the long vacation. The fact that some 15,000 pupils could not be satisfactorily accommodated during the year now closing gives an idea of the pressing need for more room; this, too, in spite of the fact that several new buildings have been erected each year.

Among the projects in the Twin Cities already assured are the following: Minneapolis branch for Northwestern Telephone Exchange Company, cost, \$10,000, W. B. Dunnell, architect. Cass Gilbert has planned an office building, to be erected on Broadway and Chambers Street, New York City, for the Andrews Estate of Boston, to be eighteen stories high, of modern steel and fire-proof construction, Bedford stone for lower three stories, balance buff pressed and ornamental brick and terra-cotta, cost, \$700,000; contract has been let to Geo. A. Fuller Company.

ANOTHER CASE OF MISTAKEN IDENTITY.

EDITORS THE BRICKBUILDER:—

Dear Sirs:—The subject allotted to your Washington correspondent does not appear to have been a congenial one, notwithstanding the tendency to volubility, against which his candid friends



TERRA-COTTA FENCE.
Executed by the Northwestern Terra-Cotta Company.

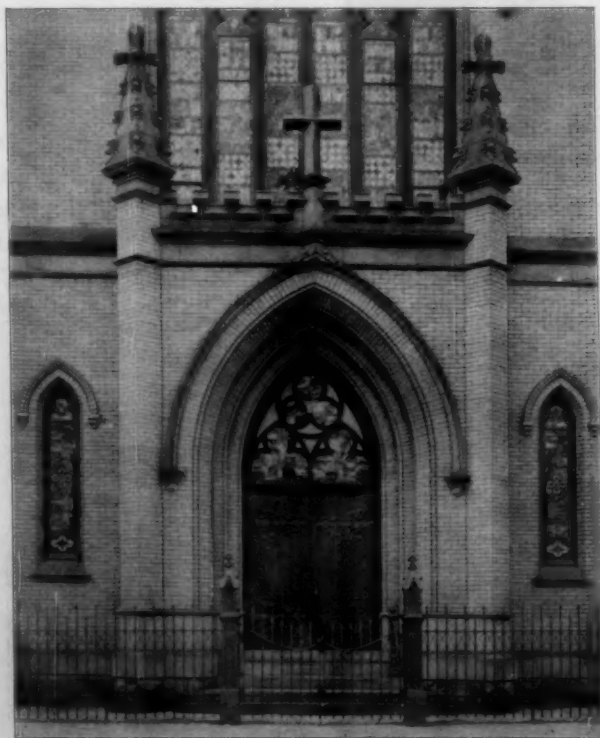
have warned him. He enters upon it with frankly confessed misgivings, and pursues it at length in a style that is in turns discursive, reminiscent, apologetic, but never seriously critical. In his remarks on the Hotel Raleigh he draws on his imagination in a way that is quite entertaining. "The lower portion and most of the ornamental work above are of stone." Indeed? Ask Mr. Fitzpatrick to take another look at the Raleigh; it will repay him the trouble of a second and less superficial inspection. He will, I think, find that the two lower stories *are* of stone, above which come nine stories of brick and terra-cotta.

In point of style this building bears a much closer resemblance to the Hotel Martinique, 33d Street and Broadway, New York, than it does to the neighboring Astoria. These three hotels were designed by the same architect, and the terra-cotta for all of them was executed by the same company.

The Martinique starts with four stories of excellent cut stone, surmounted by twelve stories of terra-cotta and brick walling, to which has been awarded the palm for superior excellence. Doubting readers—if such there be—who happen to pass that way are hereby invited to pause long enough to make the comparison. It may help to round the angularities off their prejudices. The upper portions, including the dormers, are the more interesting; but as they reach a height of three times the width of the street the view would be at an angle of about 70 with the horizon. Unlike Melrose, these features are not seen to advantage by "the pale moonlight." If viewed aright, that must be under "the gay beams of lightsome day" soon after sunrise, and from adjacent housetops, or from an upper window in the northwest corner of the Astoria.

Yours very truly,

T. CUSACK.



DETAIL OF ENTRANCE TO ST. JOSEPH ROMAN CATHOLIC CHURCH, ALLEGHENY CITY, PA.

Built of gray brick, made by the Kittanning Brick Company.
F. C. Sauer, Architect.



VESTIBULE, NEW DETROIT OPERA HOUSE.

Finished with dull green enameled frieze, consoles, and 4 by 8 in. tiles, made by the Grueby Faience Company, Boston, Mass.

Alpheus W. Chittenden, architect of the interior construction.

ILLUSTRATED ADVERTISEMENTS.

CONKLING-ARMSTRONG TERRA-COTTA COMPANY, page v, details, Carruth House, Philadelphia; Hazelhurst & Huckel, architects.

Excelsior Terra-Cotta Company, page iv, detail of main entrance, St. Raymond's Roman Catholic Church, West Chester, N. Y.; George H. Streeton, architect.

The Northwestern Terra-Cotta Company, page ix, pavilion, exhibited at the World's Fair, Chicago.

Fiske, Homes & Co., page xxii, Plymouth Building, Minneapolis, Minn.; Frederick Kees, architect.

Raritan Hollow and Porous Brick Company, page xxvi, business block and public hall, Madison, N. J.

MANUFACTURERS' CATALOGUES AND SAMPLES DESIRED.

THE following-named architects would be pleased to receive manufacturers' catalogues and samples: Alfred H. Jacobs, 1114 Octavia Street, San Francisco, Cal.; Heacock & Hokanson, 931 Chestnut Street, Philadelphia; C. R. Dennison, Packard Building, Warren, Ohio; Charles B. Skinner, 104 Irvington Street, Cleveland, Ohio; Arthur B. Heaton, Washington Loan and Trust Building, Washington, D. C.; Grant B. Williams, Citizens National Bank Building, Parkersburg, W. Va.

CURRENT ITEMS OF INTEREST.

THE ATLANTIC TERRA-COTTA COMPANY report that they are making additions to their plant that will more than double its present capacity.

A NEW blue book for the use of architects interested in their products has been issued by the American Mason Safety Tread Company, of Boston. It will be sent on application.

DURING the year 1898 the F. W. Dodge Company sent over three million (3,000,000) reports to their subscribers, together with five thousand two hundred (5,200) answers to special inquiries.

JAMES A. DAVIS & Co., Boston, report that they have the contract to furnish the cement for the new sewerage system being put



FRONT ELEVATION.

Residence by Cope & Stewardson, Architects.

in at Worcester, Mass. The Lehigh Portland cement is the brand specified.

THE use of hollow building brick in Detroit seems to be constantly on the increase, and Chambers Brothers Company, Philadelphia, have just shipped a complete outfit of their hollow brick-making machinery to the F. H. Wolf Brick Company, of Detroit.

THE CANTON SPARTA BRICK COMPANY, Canton, Ohio, are supplying their brick for the new Burnett House and a business block at Lima, Ohio; also for the Iron Valley Bank Building at Canal Dover, Ohio. They report having numerous other orders in Cleveland and elsewhere.

THE POWHATAN CLAY MANUFACTURING COMPANY are furnishing their cream-white brick for the recreation buildings now being erected by J. H. L. Hommedieu, Son & Co., for George Gould at Lakewood, N. J., after plans drawn by Bruce Price. They are furnishing their silver-gray brick for the new bank building at Petersburg, Va., Peoples & Sharpe, architects, Norfolk, Va.; Petersburg Savings and Insurance Company, owners.

THE MT. SAVAGE ENAMELED BRICK COMPANY, Mt. Savage, Md., is furnishing the enameled brick for the new post-office building at Buffalo, N. Y., James Knox Taylor, supervising architect. This is in many respects a particularly interesting piece of enamel brick-work, having one hundred and thirty-one Gothic arches, forty-three flat arches, and a large elliptical arch. The brick are of a light shade of cream buff.

THE C. P. MERWIN BRICK COMPANY, Berlin, Conn., have made many important improvements to their plant during the last four months, chief among them being the addition to their burning and storage capacity, also the addition of a thoroughly equipped narrow gauge railway. The Central New England Brick Company, office at New Britain, Conn., are selling the productions of this yard at the present time.

WE have received from the Pennsylvania Enamelled Brick Company two samples of their "Sanitary Brick." These brick are faced with an impervious glazed surface upon a stiff mud body, are light in color, and easily cleaned. They are especially adapted for schoolhouses, hospitals, hallways, lavatories, etc., where an absolutely impervious surface is required at a small cost. We understand that the company have sold a large number of these brick this season.

THE WINKLE TERRA-COTTA COMPANY have secured contracts to supply the architectural terra-cotta for the following buildings: the 11th Street Realty Company Building, height seven stories, St. Louis, Mo., Isaac S. Taylor, architect; the Lindell Realty Company Building, height seven stories, St. Louis, Mo., Shepley, Rutan & Coolidge, architects; building for the Hon. Wilbur F. Boyle, trustee, height seven stories, St. Louis, Mo., Shepley, Rutan & Coolidge, architects.

J. C. EWART & Co. are supplying their Akron roofing tile for a large church near Pittsburgh, Pa., for the new office building of the Monessen Steel Company, for a residence at Halifax, Nova Scotia, for a residence at St. Louis, also for a number of residences at New York City and Philadelphia. They wish stated that they are now making a specialty of 6 by 9 in. flat tile thoroughly vitrified for flat roofs; also of their Summit roofing tile for large work.



TERRA-COTTA PANEL.

Executed by the New Jersey Terra-Cotta Company.

THE CELADON TERRA-COTTA COMPANY, LTD., are furnishing their roofing tile for the following buildings: The Laclede Gas Light and Coal Company Building, St. Louis (German tile used), W. Morava, engineer; station for the C. R. I. & P. Ry., at Council Bluffs, Iowa (open shingle tiles used), Frost & Granger, architects; Lagonda Cottage, Boys' Industrial School, Lancaster, Ohio (10 in. Conosera tiles used), Richards & McCarty, architects; pumping station, Newport News, Va. (8 in. Conosera tiles used), Alexander Potter, engineer.

MOORE & WYMAN, elevator and machine works, Boston, have recently secured orders for their elevators as follows: An electric passenger and an electric freight elevator for the Parker Building,



REAR ELEVATION.

Residence by Cope & Stewardson, Architects.

corner Summer and South Streets, Boston, Chapman & Frazer, architects; an hydraulic plunger elevator for the Metropolitan Water Works at the pumping station, Chestnut Hill Reservoir; a belt freight elevator and hydraulic plunger elevator for F. W. Bird & Son, East Walpole, Mass.; two electric freight elevators and one electric passenger elevator for the Winch Bros. Building, 590 Atlantic Avenue, Boston, Christel Orvis, architect. They are also building a large amount of special machinery on recent orders.

THOMAS BROTHERS, Detroit, Mich., wish to announce that their suite of offices as now arranged permits of a fine display of the various lines of clay products which they handle. Their exhibit room contains a number of brick panels laid up in a manner calculated to show the color effects of different bricks as they appear when in a building. Samples of their other lines, such as roofing tile, terracotta, etc., are also shown to advantage. The company are agents for the Cleveland, Findlay, St. Louis, Illinois, New York, and Chicago Hydraulic-Press Brick Companies, also for the Ludowici Roofing Tile Company, the American Terra-Cotta and Ceramic Company, the Mosaic Tile Company, and the Mackolite Fire-proofing Company.

THE COLUMBUS FACE BRICK COMPANY, Columbus, Ohio, report phenomenal success in the making and selling of its "gold mottled" face brick, the "Ironclay," which is now out in standard and Roman sizes and ornamental shapes. The excellent quality and beautiful coloring of this new line have received the praise of architects and builders wherever it has been shown. The company has many fine contracts in hand, and is busy day and night with preparations for the prompt filling of its orders. Agencies are being established in the principal markets as fast as the increasing production will justify promises of shipments, for it is a cardinal principle of the management to keep its promises to all patrons alike.

THE new catalogue just issued by the Lehigh Portland Cement

Company, Allentown, Pa., descriptive of their works and products, is an attractive and instructive little booklet of some thirty-five pages. Illustrations are shown of the plant both as a whole and in detail, and also of some of the prominent buildings and public works wherein this cement has been used. A number of tests by competent engineers who have used the cement are quoted as showing some of the excellent records made by this brand. The closing pages of the catalogue are devoted to a collection of suggestions for cement users, under the title of "Instructions for Using Portland Cement." These rules are practical and instructive. Parties desiring one of these catalogues should request same of the company, or of James A. Davis & Co., agents, 92 State Street, Boston.

THE CLEVELAND HYDRAULIC-PRESS BRICK COMPANY report that at no time in the history of their company have they entered so large an amount of good orders as during the present year. In addition to the increased business for their products in the general markets an unusual number of orders have developed in the cities of Cleveland, Cincinnati, Pittsburgh, and Buffalo. The company desire to call special attention to their two new shades of impervious brick, brown and pink. These brick have all the individual characteristics peculiar to their well-known "Akron Red" brick, and the demand for them has been so large that it has been impossible to accumulate much reserve stock. As regards the "Akron Red" brick, the company announce that they carry a reserve stock that seldom falls below 3,000,000, and are therefore in a position to handle promptly any orders on same, even if the requirements are unusual.

THE COLUMBUS BRICK AND TERRA-COTTA COMPANY are furnishing the brick for the following operations: Deaf and Dumb Institution, Columbus, Ohio, dark gray and dark buff; St. Hedwig's Church, Chicago, Ill., dark gray; colored Baptist Church, Lynchburg, Va., light buff; Presbyterian Church, Lynchburg, Va., light gray; South High School, Columbus, Ohio, light buff; public school, Polo, Ill., dark buff and light gray; United Brethren Church,



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515 Liberty Square,
Boston, Mass.

Union Furnace, Ohio, dark buff. They report large sales of their mottled shades in New York, Rochester, Pa., Detroit, Mich., Marion, Ind., and Columbus, Ohio. In the latter city they have under construction over forty structures, in various shades of their buff, terracotta, and gray; also several fronts of glazed bricks. They have orders entered for several hundred thousand Romans, including one large operation in Troy, N. Y.

NOTHING better illustrates the advance in design and construction of buildings we now see witnessed about us than the return to the first principles of man in his wild estate, viz.: light and fresh air. It is remarkable how careless of this very important consideration builders were even a few years past.

The recognized method of securing good ventilation to-day is by the use of well-designed ventilators. The "Star" Ventilator, manufactured by Merchant & Co., Incorporated, of Philadelphia, New York, and Chicago, seems to be very nearly perfect in its design. The functions of the ventilator are to practically give a free discharge of air from within a building and to prevent the entrance of air within the building from without, and at the same time be storm proof and free from drip due to condensation. The "Star" accomplishes all these results to perfection. The recent large order this company received from the United States Government for nearly a thousand ventilators speaks for itself and is an indorsement of which any one may well be proud. Any designer or constructor of a building should communicate with this company before deciding on their details for ventilators or skylights. It is made with or without a glass top when required. Merchant & Co., Incorporated, also make a specialty of Spanish tiles, which are very extensively used.

THE SIMPSON BRICK MACHINERY COMPANY, Chicago, is placing on the market a repress that is everywhere giving eminent satisfaction under the severest tests. The machine is called the

Simpson Challenge Double-Mold Repress. The following will give an idea of the mechanical construction of the machine:—

"The main principle of the Challenge Repress is a double crank, one of which is situated between two master gears and operates the top plunger. The other cranks are situated at the end of the main shaft and outside of each frame. These two cranks operate the lower plunger. The pressure is given to the brick by the difference in length of these cranks, the center crank being longer than the outside crank; the former moves faster than the latter, and consequently the brick is pressed by this differential movement of the cranks, due to their difference in length.

"It will be seen that the brick is moving while it is being pressed, and not only this, but the pressing of the brick is finished when the top plunger is at least $3\frac{1}{2}$ ins down into the mold. This $3\frac{1}{2}$ ins. added to the thickness of the brick gives from $5\frac{1}{2}$ to 6 ins. of mold travel, in ejecting the brick upwards out of the mold. This has the effect of giving the surface of the brick a splendid polish, making it equal in finish to a dry press-brick, which is a feature so far unattainable in a repress.

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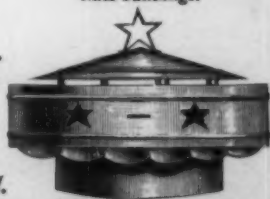
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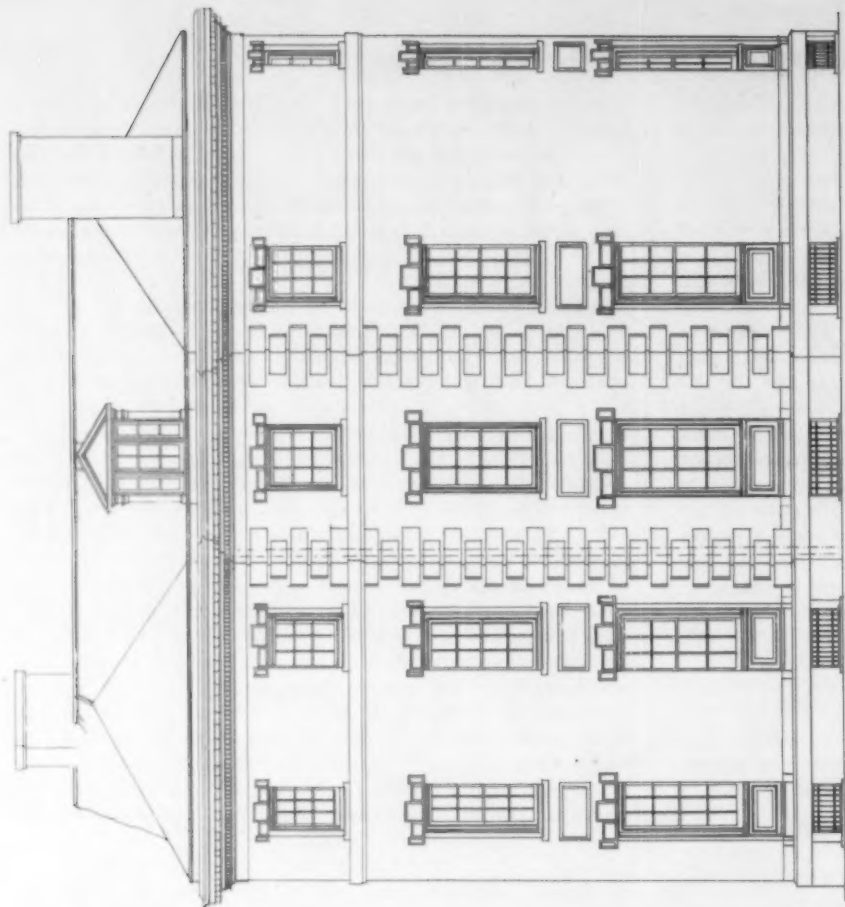
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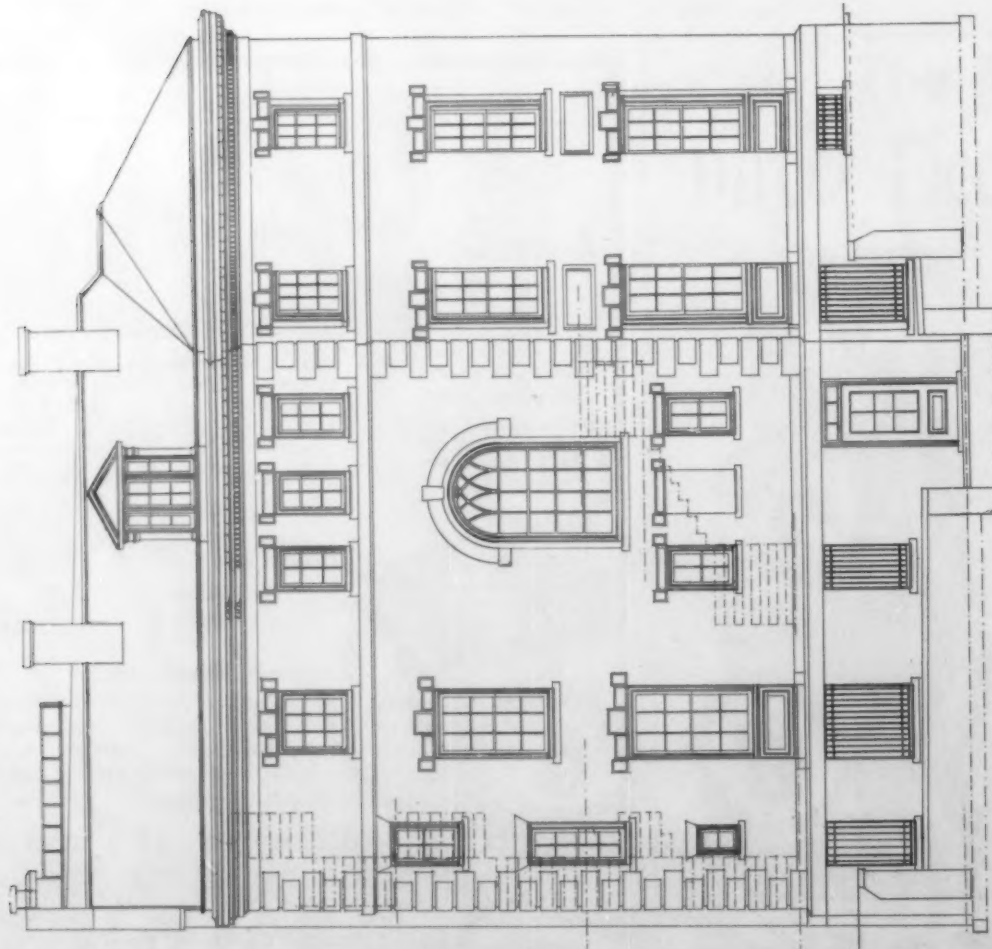
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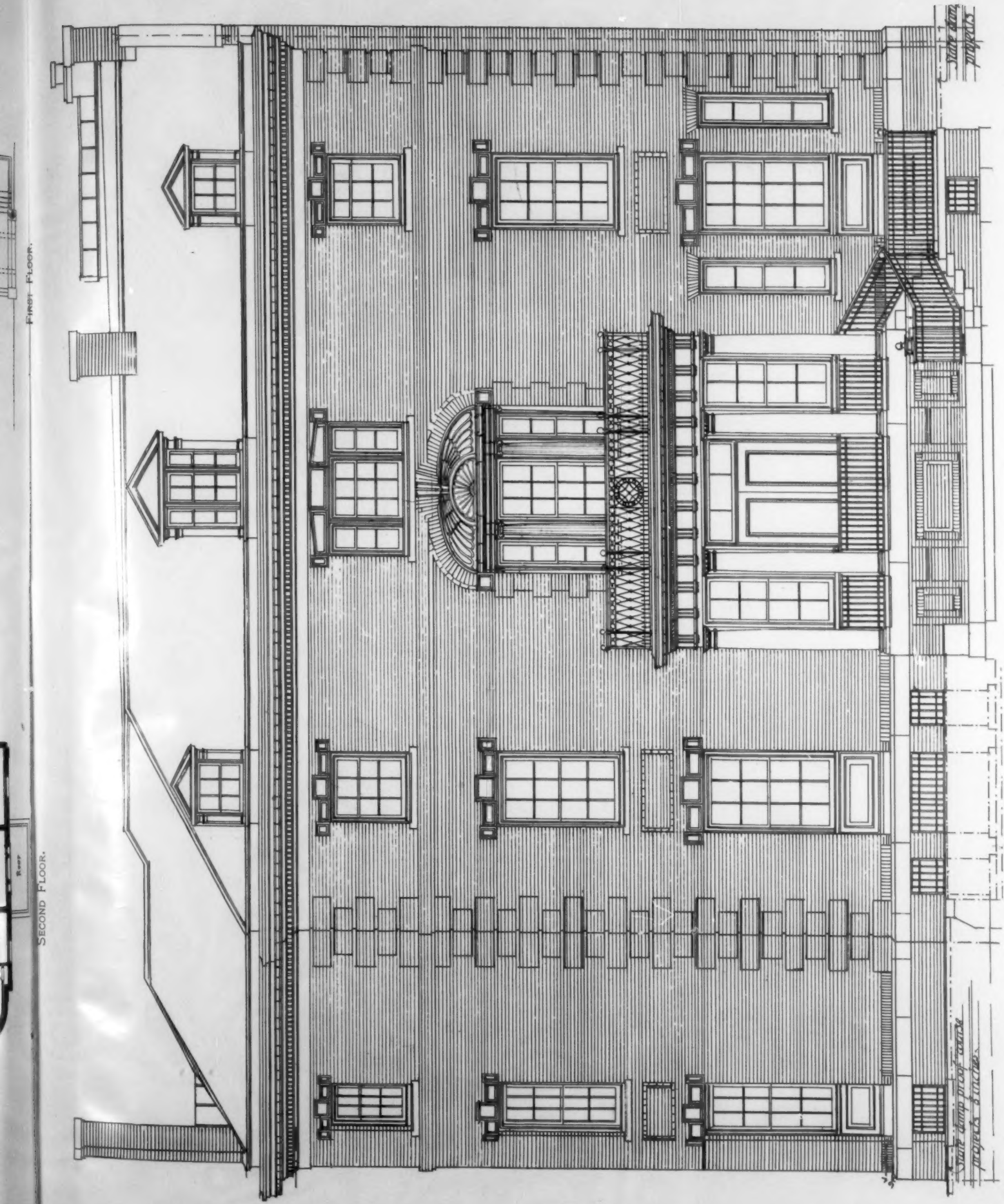
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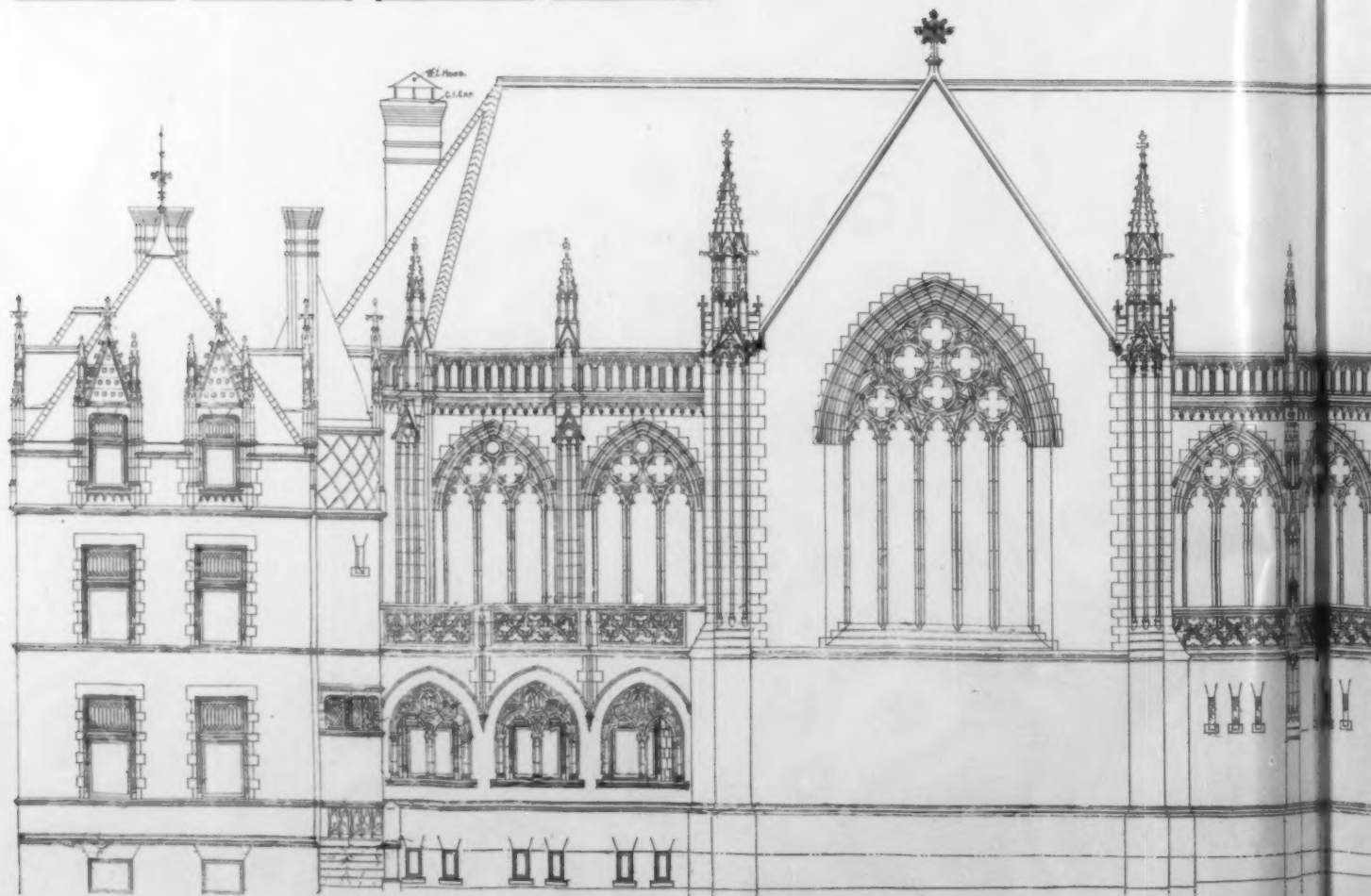
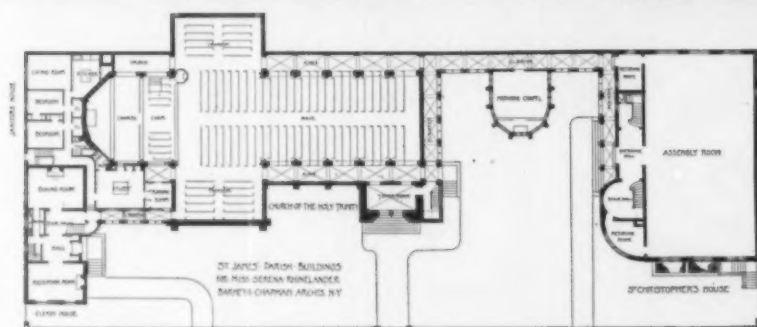
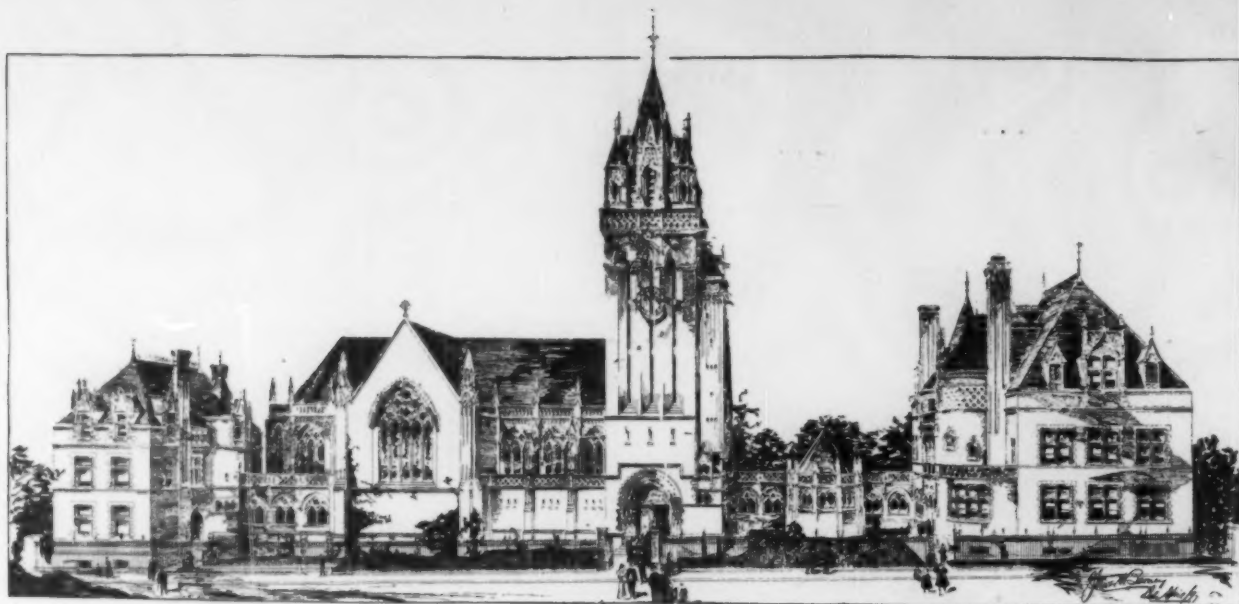
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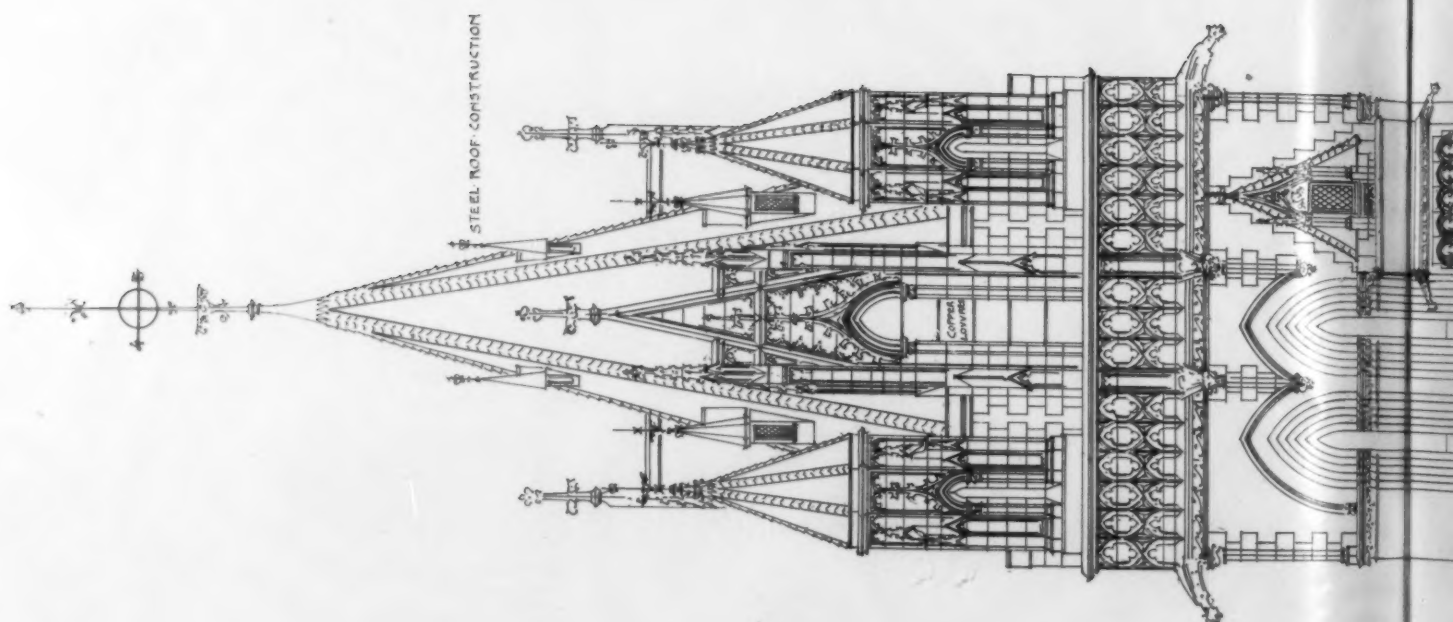
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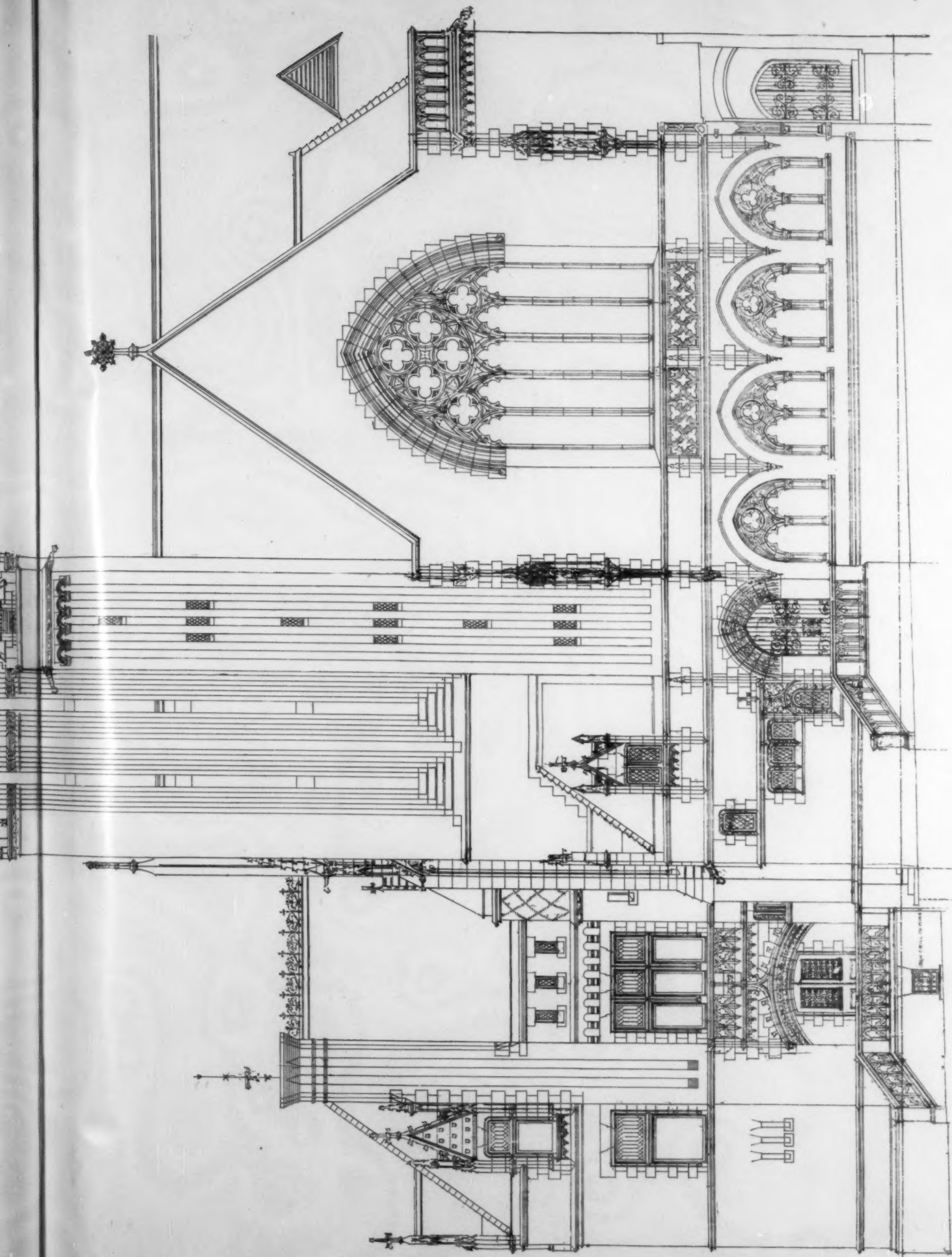


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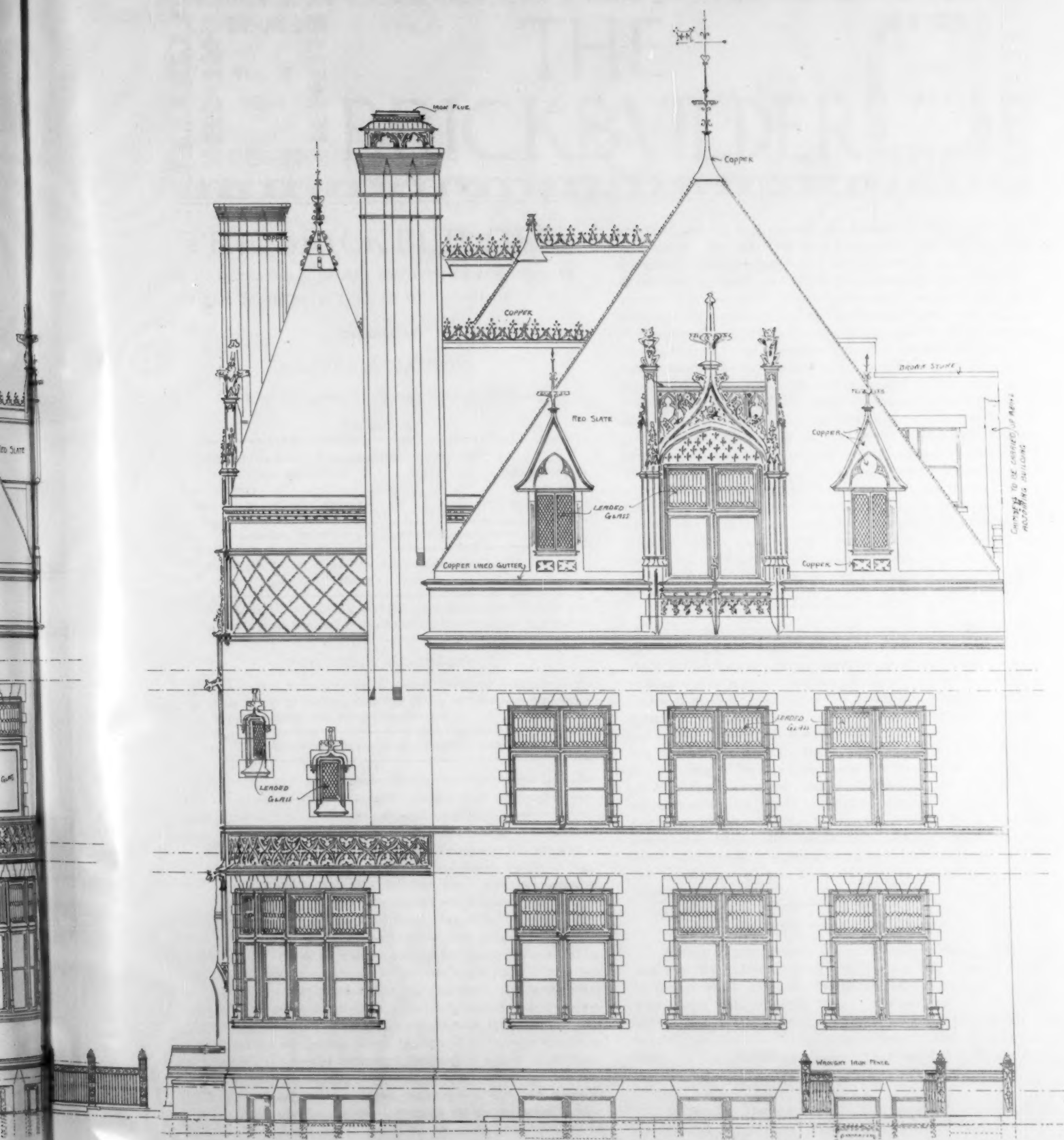


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